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ICC

IRRINET CONTROL CENTER

ICC-XL V.13 MANUAL

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Chapter

1

Introduction:

The entire control system is comprised of the SCADA central computer as a master station also known as Field Interface Unit (FIU), communicating with Remote Terminal Units also known (RTU/s) over various communication links, such as conventional radio, trunked radio, microwave, wireline, phone, IP,(LAN, WAN) etc…. The communication system is used for transmitting alarms, status information, telemetric readings, calculated data, diagnostics, and error logging information from the RTUs to the central computer and vice versa.

It is also used for downloading, monitoring, and debugging the application program at each site. The system can be relatively simple, comprising several RTUs and a control center, or a more complicated hierarchical system, where several sub-centrals communicate with lower, parallel and higher hierarchies. The RTUs may also communicate with each other and/or with any other hierarchy in the system.

Terminology:

Remote Terminal Unit (RTU):

The RTU is a smart modular unit designed to operate as a stand-alone controller or as part of a system having any number of RTUs, control centers, and sub-centrals connected through a communication network with any number of links and nodes.

The RTU is configured and loaded with the appropriate application using the Programming ToolBox.

The RTU is a microprocessor-based unit, which consists of a CPU module and various I/O and communication modules. The very wide range of I/O and communication modules makes the CPU420 (IRRInet-XM) system flexible to satisfy any application requirements. IRRInet-XL, on the other hand, is a lighter version with a limited number of local I/O modules but same features as that of IRRInet-XM.

The RTUs communicate using the MDLC protocol, based on the seven layers of the OSI (Open Systems Interconnection) model published by ISO, and adapted for SCADA communications. The protocol provides network support and multiple logical channels per physical port, enabling simultaneous central-to-RTU and RTU-to-RTU sessions. It also enables each RTU to *simultaneously* run several communication sessions, such as data exchange, on-line monitoring, diagnostics, etc.

The RTU is discussed in more detail later in this manual. For technical information, consult the Owner's manual and the Service manual. Note that throughout this documentation, the terms RTU and Field Unit are used interchangeably.

Control Center:

The control center computer, with the user interface, provides the user with full graphic control of the RTUs' operation, including database and parameter changes, and on-line program monitoring for the system operator. This manual will be reviewing the IRRInet Control Center (ICC).

Overview:

Motorola's ICC (IRRInet Control Center) provides sophisticated, yet easy to use irrigation monitor and control capabilities operating on a PC or Server running Microsoft Windows 2000 or XP. Tasks such as writing programs, sending data, receiving data and viewing alarms are enhanced by a user interface and advanced features such as user-created graphic screens.

Preparing to Install ICC:

Always "Check with your system administrator or LAN manager before installing any application on your "computer.

Checklist:

Minimum system requirements:

OS: Windows 2000 or XP Professional Edition.

Hard drive: Minimum of 20 GB of hard drive space partitioned.

Processor: PIII 700 MHz or faster CPU.

Memory: 256 MB or more.

Video: Video Card capable of 1024x768 resolutions.

Sound Card: Sound Card.

Modems: Modems (pending to the type of system you are running, a modem may be needed for each of the following).

Weather station.

PCanywhere

Pager.

DTMF

One way

Two way

PCANYWHERE. (PCANYWHERE is a remote access software, which will be used by your reseller for support or online training)

Network Card: Network card should be added to the computer if ICC is used over the network.

Printer: Printer will be used to print reports and alarms as needed by the system operator.

To install ICC 13.0 you will need a 9 digit Motorola key. This key is generated and is custom to your project, your project name is case sensitive and may not be changed.

Check with your system administrator or LAN manager before installing any application on your computer.

Before installing ICC, review the following checklist for successful installation.

Check the README file on the CD-ROM for any last minute information that was not available when this guide went to print. To open the file, use Windows Explorer (right click on the Start button on the toolbar, choose Explore) and look for the CD-ROM drive. Expand this icon, and double click on the file README.TXT.

Have your FIU connected to via RS232 to serial port of the computer, if you have a dual CPU FIU make sure both CPUs are connected to your computer For more details ask your reseller for help.

Before installing ICC, Close all applications (Weather, office etc…) and backup all data on your computer.

Turn off Anti-Virus, and restart after installation is completed.

Make sure you have administrator level access, to the computer. If your computer is on a network contact your system administrator for rules on installing ICC on the computer.

The ICC computer should be a dedicated computer; some applications may conflict with SCADA applications. Microsoft provides lists of such applications, you may also contact your reseller for more info.

If you have ICC 10.0X installed on your computer, back up your project and uninstall ICC 10.0x before installing ICC 13.0X.

Installing ICC:

Quick Start Installation:

Note: ICC 13.0Xis independent of ICC 10.X. It is important to note each application is independent of the other, however cannot run or be installed on the same computer. Before running or installing icc13.0Xmake sure you have all other applications closed.

**** Warning: Installing or reinstalling ICC could significantly affect your system. Always ask your Motorola Reseller for advice. If you are reinstalling ICC it is important that you back up your data. ICC data is usually located at **C:\Program Files\Motorola\ICC - IRRINET Control Center\prj.**

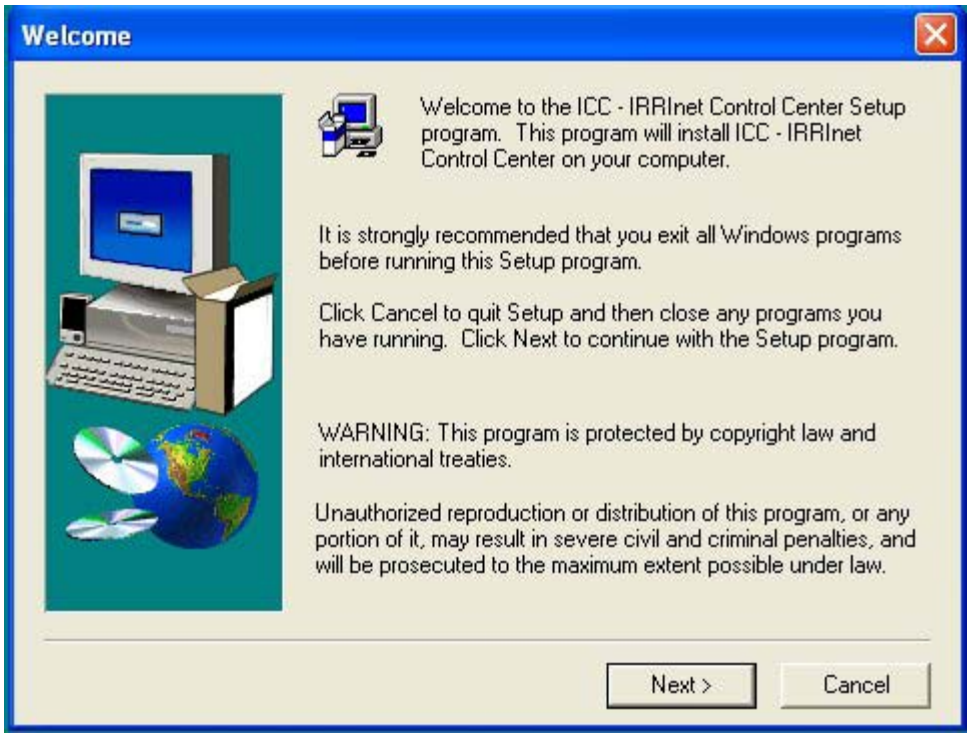
Start Windows.

Insert the ICC CD-ROM into the CD-ROM drive of your computer.

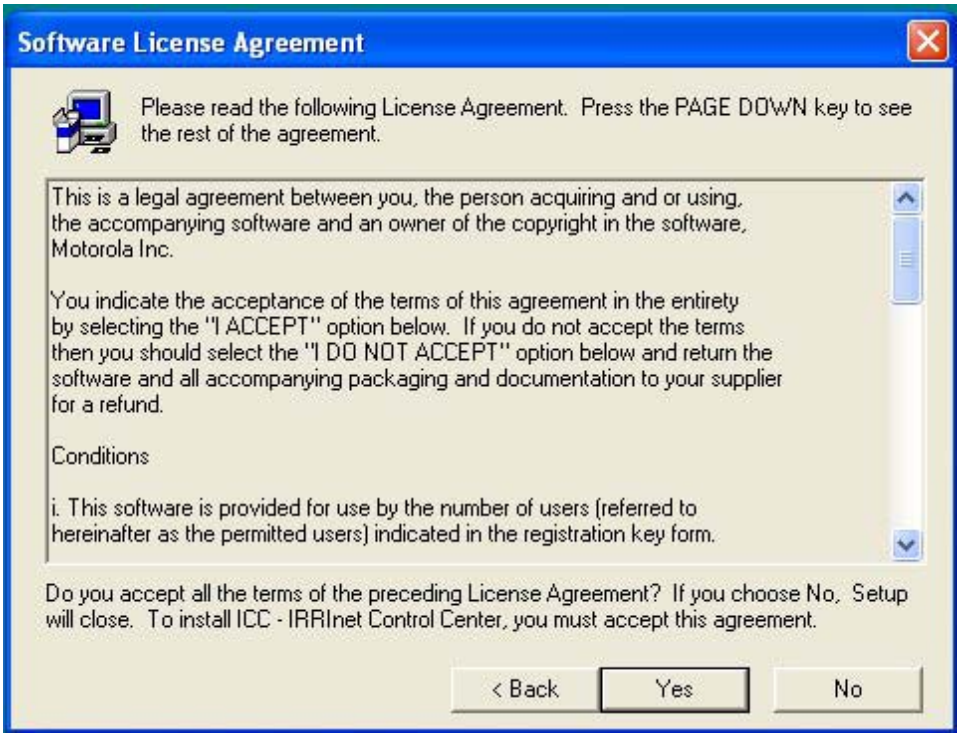
Locate the ICC folder and double click on the "Setup" file.

The following screen is the first screen you will see.

ICC - IRRINET Control Center
Version 13
Copyright (c) 2002
Motorola Inc.
1301 E. Algonquin Rd
Schaumburg, IL 60196 USA
This program is protected by US and international copyright laws.


Welcome
Welcome to the ICC - IRRInet Control Center Setup program. This program will install ICC - IRRInet Control Center on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
Next >
Cancel

Click Next at the Welcome window.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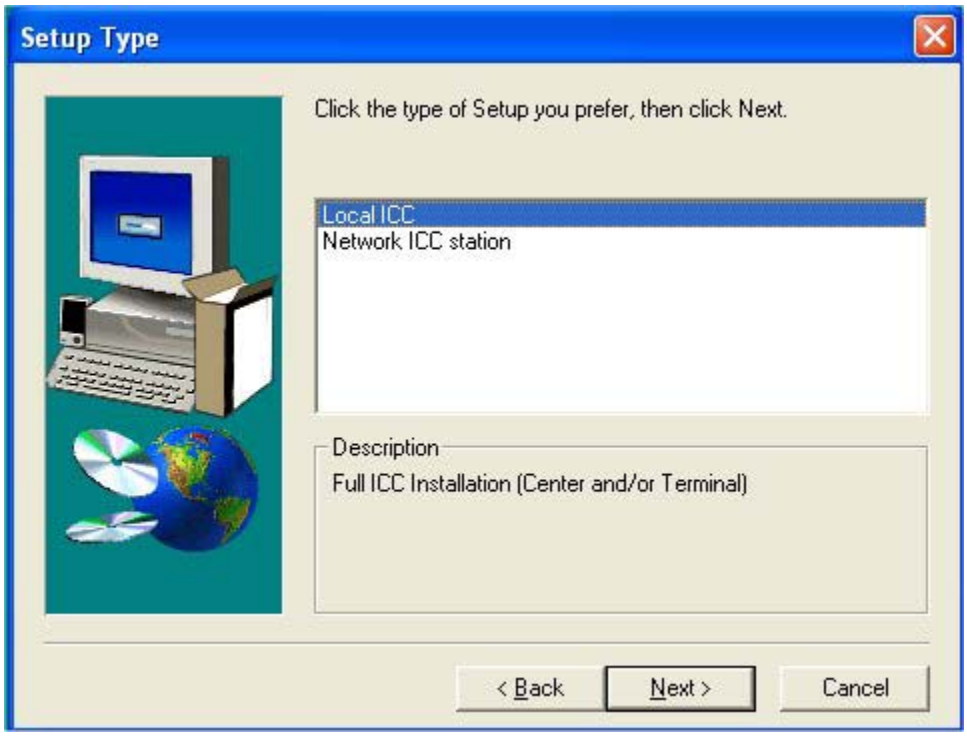
Conditions
i. This software is provided for use by the number of users (referred to hereinafter as the permitted users) indicated in the registration key form.
Do you accept all the terms of the preceding License Agreement? If you choose No, Setup will close. To install ICC - IRRInet Control Center, you must accept this agreement.
< Back
Yes
No

Read the Software License Agreement carefully; use the scroll bar on the right side to scroll up or down. If you agree with the license click Yes to continue!

Setup Type:



ICC is network compatible software.

Local ICC: This option will install the ICC locally on this computer and intern creating a project locally. This installation (sometimes called ICC server) is installed on the computer, which will have the project data.

Network ICC: Choose Network ICC if you have already installed a local version of ICC and are planning to connect to this computer via an IP network.

You may have more than one computer access and edit your project if you are connected to a LAN or WAN TCP/IP network to a central ICC server. The project folder on the server should be shared with the host computer, which the network ICC is being installed on.

Networking ICC:

To simplify this portion of installation we will cover it in 3 segments:

Segment 1: Sharing ICC Folder

Share the ICC Directory on the main computer with the user/s on the network who need access.

From the user computer Map the Network drive to ICC Directory on the main computer.

Install and point the ICC.

Segment 1: Share the ICC Directory on the main computer with the user/s on the network who need access

Sharing the ICC Folder…

This step could be different pending to witch version of windows you are running. We will follow this procedure on Win XP.

WARNING: Before sharing any file or folder on your network, check with your LAN admin. Sharing files could jeopardize the security of your network.

Follow the all the parts of Step 1 on both the computer sharing files and on the computer that needs to get to those files.

Step 1: Windows 2000, and XP

Right-click on My Network Places and click Properties.

Right-click Local Area Connection and click Properties.

Look at all of the entries in the Network Components (scroll if you have to) for "File and Printer sharing for Microsoft Networks." If it is there, move on to "Step 2: Sharing Files".

Click the Install button.

Double click on Service.

Click on Microsoft.

Double click on File and Printer sharing for Microsoft Networks.

When you get back to the Network Properties box, click OK Click Yes on the "Do you want to Restart Now" box if it appears.

Segment 2: Sharing Files

Windows 2000 and XP
If you have a Static IP follow these instructions, if you have a Dynamic IP, use the computer name instead (make sure there is a DNS server on the network to translate the computer name with an assigned IP address).

a. Click on Start, and then Run. Type cmd. Click OK.

b. Type ipconfig. Press the Enter key.

c. Find the line that says "IP Address". Copy down that number, and name it "Remote Computer's IP".

d. Type exit.

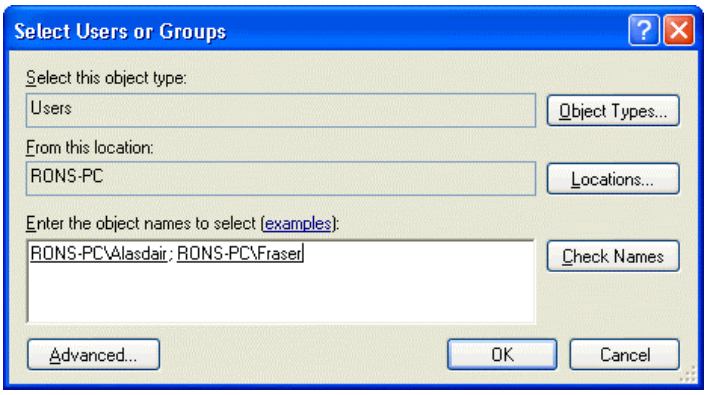
e. Go to C:\Program Files\Motorola and right click on "ICC - IRRInet Control Center" and choose the option 'sharing'.

f. Click the radio button next to 'Shared As'. You can change the Share Name and add a comment if you wish. You can also change the Access Type and Password. Do not choose Read-Only (Read-Only means that whoever accesses this shared folder can only read files in it (the files can't be deleted or changed)). Full means that all files in that folder can be read, changed, and deleted. Depends on Password is just that. The type of access (Read-Only/Full) depends on the password the person enters. We suggest you use a password for all shares that you use so that your files will not be taken by anyone, but a password is not needed.

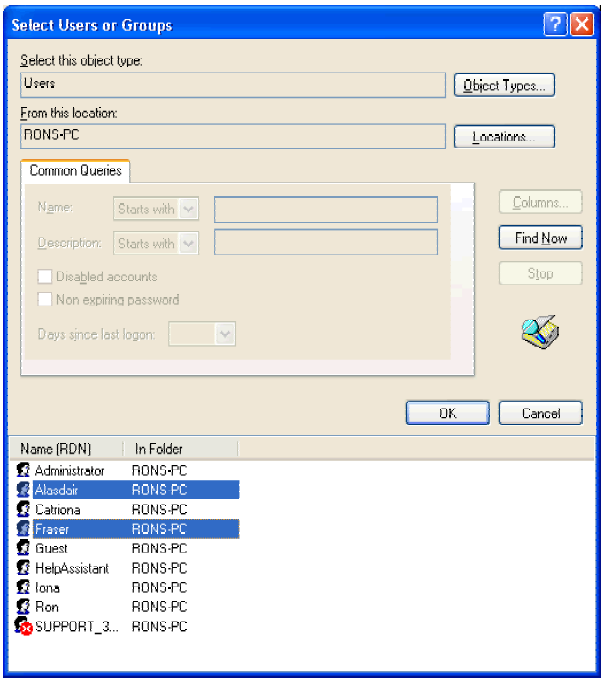
Click *Permissions*. Notice how, by default, the *Everyone* group has *Full Control*. This means that all users can read, write, and even delete files. That might **not** be what you want! Ask your LAN admin which option to use!

To give access to an individual user or To change the share permissions:

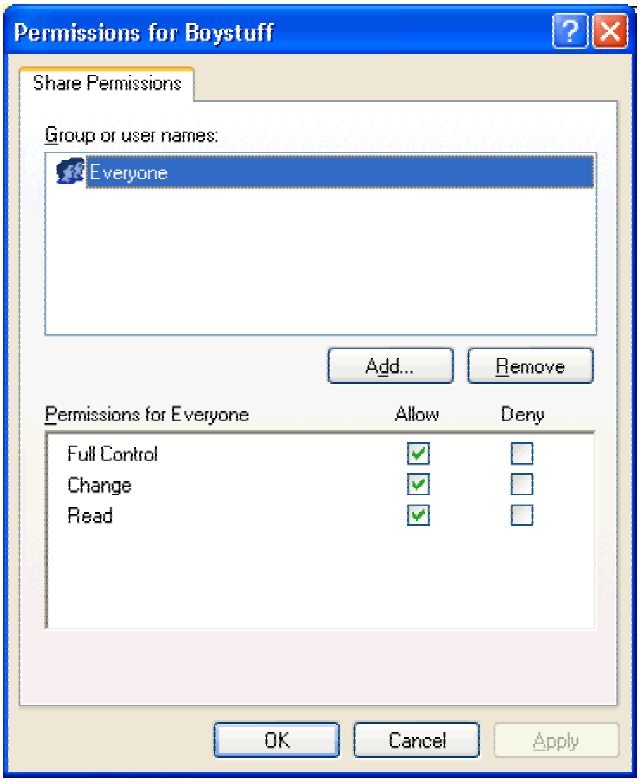
1. Click *Add*, and then choose *Object Types*.
2. Un-check *Built-in security principles* and *Groups*, because we only want to see *Users*.
3. Click *OK*. *From this location* should show the name of your computer.
4. Choose *Advanced*, and click *Find Now*.



Click on the users who should have access this share.



Click ok and give the users full control to this folder.



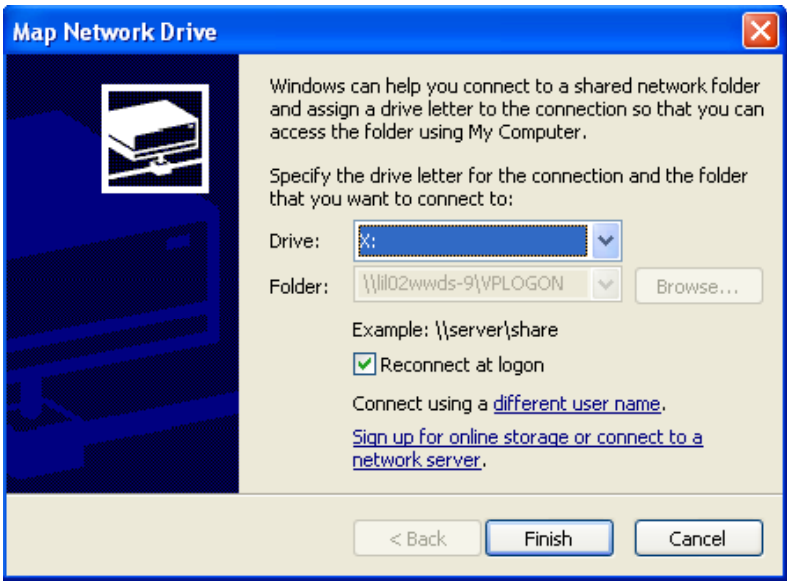
7. Click OK twice.

Segment 3: Accessing Shares

Click on Start, and then Run. Type \\ and then type the computer name of the ICC computer or the IP address. For example, \\Frankscomputer or 111.111.111.1 . Press Enter. It may take a while for the computer to come up.

Now you should be able to access the shared folders on the ICC computer.

Right click on this file and click on "Map Network Drive".


Map Network Drive
Windows can help you connect to a shared network folder and assign a drive letter to the connection so that you can access the folder using My Computer.
Specify the drive letter for the connection and the folder that you want to connect to:
Drive:
X:
Folder:
\\lil02wwds-9\VPLOGON
Browse...
Example: \\server\share
Reconnect at logon
Connect using a different user name.
Sign up for online storage or connect to a network server.
< Back
Finish
Cancel

Map the drive to an available drive letter.

Make sure to check the box "Reconnect at logon"

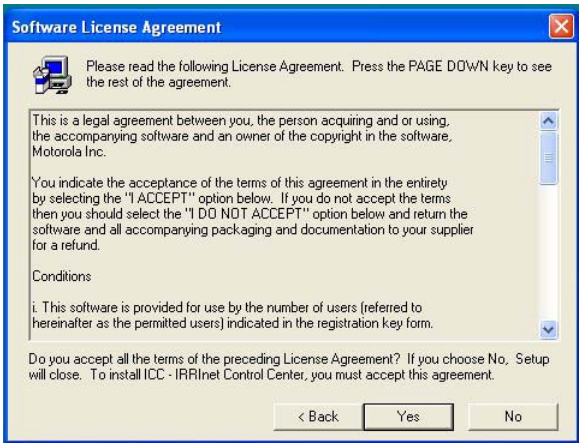
You should now be able to see the ICC directory of the main PC in "My Computer" as drive letter you have chosen.

We are at the Final step of ICC network installation. It will be reviewed briefly from the beginning. We will then link the ICC network to the mapped drive…

From your ICC CD double click on Setup.

Welcome
Welcome to the ICC - IRRInet Control Center Setup program. This program will install ICC - IRRInet Control Center on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
Next >
Cancel

Click Next at the welcome window.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Conditions
i. This software is provided for use by the number of users (referred to hereinafter as the permitted users) indicated in the registration key form.
Do you accept all the terms of the preceding License Agreement? If you choose No, Setup will close. To install ICC - IRRInet Control Center, you must accept this agreement.
< Back
Yes
No

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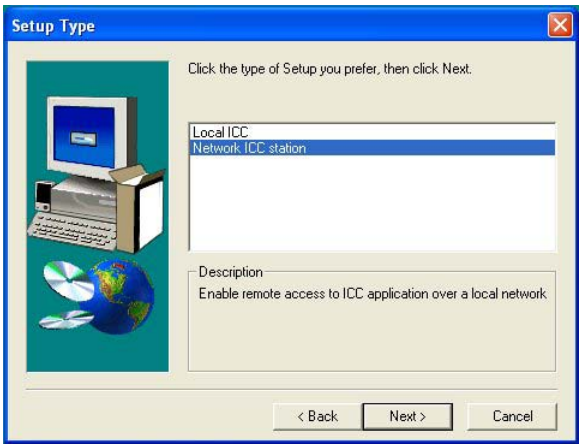
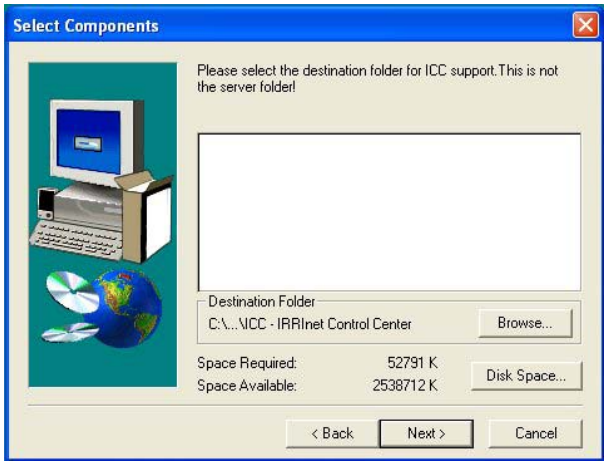
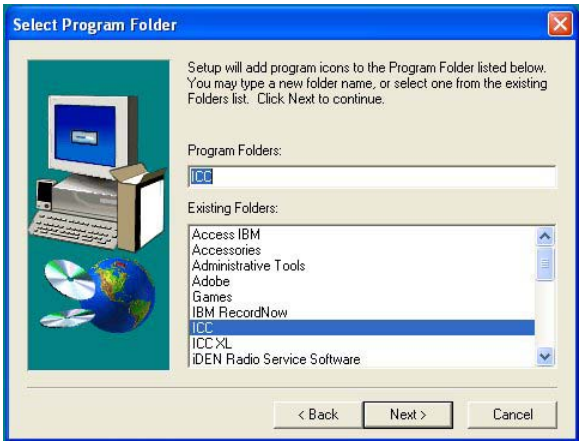

Setup Type
Click the type of Setup you prefer, then click Next.
Local ICC
Network ICC station
Description
Enable remote access to ICC application over a local network
< Back
Next >
Cancel

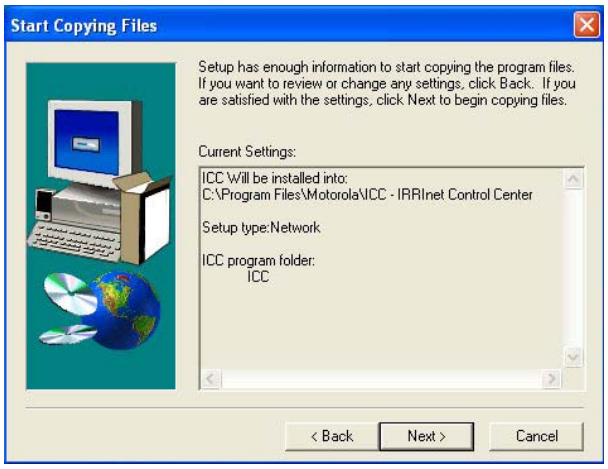
Choose "Network ICC Station" from Setup Type window.



Since there are no components to this software, click Next in the Select Component window.



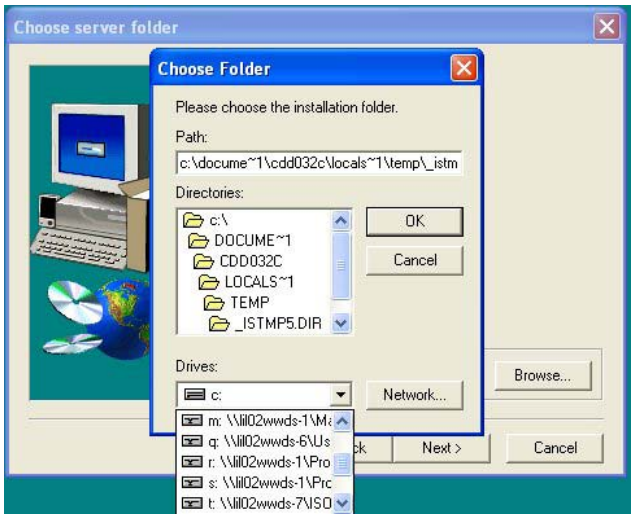
Let Windows choose the Select Program Folder and click Next.


Start Copying Files
Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files.
Current Settings:
ICC Will be installed into:
C:\Program Files\Motorola\ICC - IRRInet Control Center
Setup type:Network
ICC program folder:
ICC
< Back
Next >
Cancel

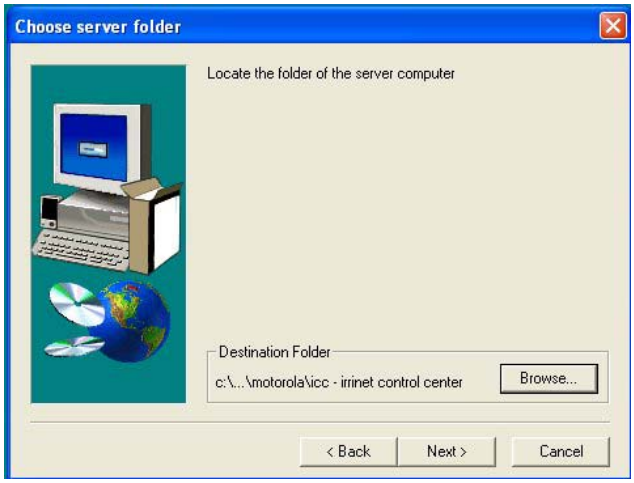
Start Next to start the installation in the Start Copying Files window.

A window will appear after the setup, which will ask you to Choose Server Folder. Click on the Browse button.

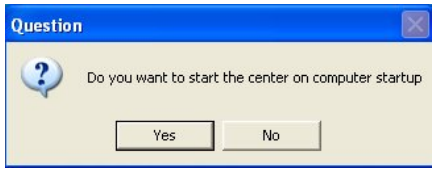
From the Drives list find the Drive we added in the past procedure and point the ICC – IRRInet Control Center directory.



Click ok.



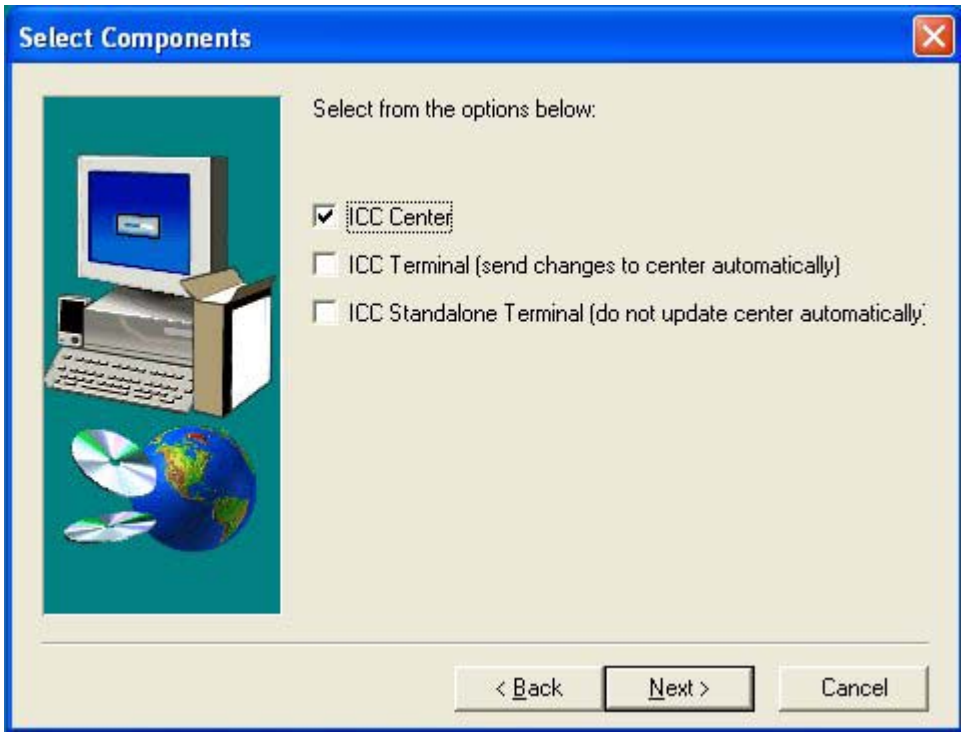
Click next to finish the installation.



A question will pop up asking if you would like to start ICC every time windows starts, choose yes or no.

ICC is now installed and an ICON on your desktop called ICC should be displayed.

This procedure is for advance users only, for mapping and permission in windows it is always best to consult your Network Administrator.


Select Components
Select from the options below:
ICC Center
ICC Terminal (send changes to center automatically)
ICC Standalone Terminal (do not update center automatically)
< Back
Next >
Cancel

Installation Options:

There are three local ICC installation options.

ICC Center: ICC center is the full installation of ICC with local connection to an FIU. The ICC database will be kept on local hard drive.

ICC Terminal: This option will install ICC on a terminal computer. This computer can then be connected to any RTU to program. Think of this option as a remote "Keyboard", all the changes will then be send to the central ICC computer VIA the RTU to FIU communication.

ICC Standalone Terminal: Using this option you may install ICC on a laptop or a computer to operate RTU or an FIU with direct RS232 communication. Many of the options do not exist in ICC Standalone, if a user chooses to program an RTU using this installation the data will not be sent to a central.

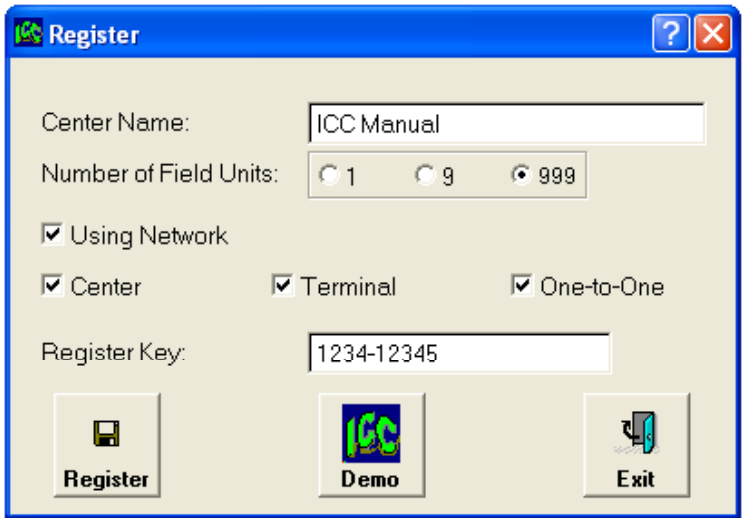
Successful software installation will finish with a screen asking you "if you would like to place ICC in startup". In later chapters we are going to talk about the importance of ICC PC being a dedicated PC and why ICC should not be shot down. This option exist incase of such incidents like power blip which would

cause your computer to restart. Such option will make sure ICC starts even you are not present.

Initial Data Entry:

You will be prompted for the following information upon start up for the first time.

Center Name: (This is the name you registered with Motorola, it is case sensitive)



Field units: Choose the number of field units that match your system.

If using network (LAN) check the box "using network", Check the number of the Field Units you have purchased license. Finally type in your Registration key given to you by Motorola.

Registration Key: Each system has a unique registration key that must be provided by Motorola to the reseller who in turn delivers it with the system.

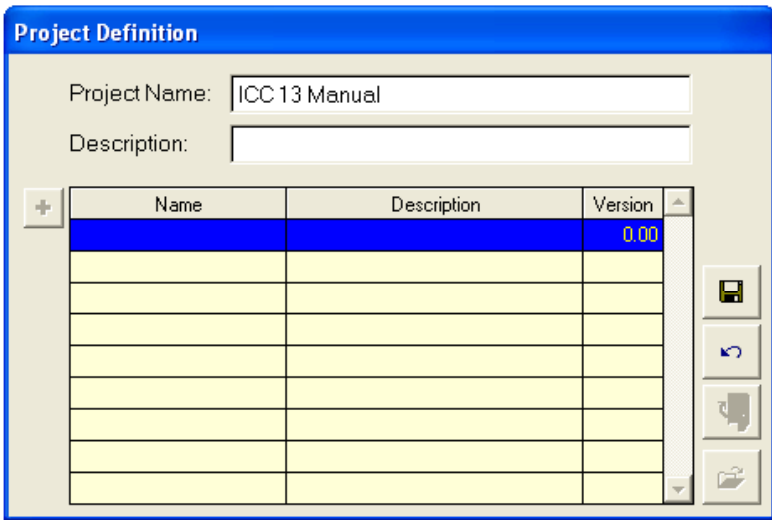
Click on the Register button--you will then get one of three results:

1. If the key and all data were entered correctly, you may operate the ICC with communication through the FIU. Please note that the Center name is case sensitive!

2. If you do not have key, you may choose DEMO, which allows you to operate the application without communication. You may connect to this RTU alone. 3.

You may also choose exit to leave this application.

Define/Create A Project:



ICC supports "projects" which are used, one per FIU, to define a centrally controlled system. Because ICC supports networking across a LAN, it is possible to have one workstation accessing more than one FIU server. Each FIU server would be a different project.

Define your first project by typing in the Project Name and then a Description.

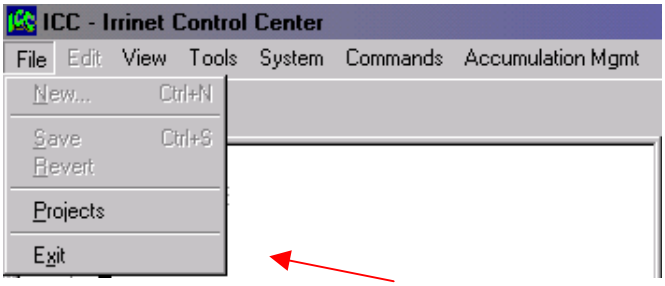
Save the data, and then open the project.

ICC Startup and Shut Down:

To start ICC, Double click on the ICC icon on your desktop, or choose ICC from your startup menu.

ICC will start and ask for your "Login" and "Password". Click on the "Lock and Key" after you have entered your information.

Shutting Down ICC



You may click on Exit from the file menu, on the X (at the top right of the screen) or press Alt+F4 to leave ICC.

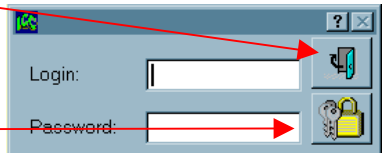
ICC - Irrinet Control Center
File Edit View Tools System Commands Accumulation Mgmt Events Pager Flow Utilities Graphs OffLine Weather Window Help
Fixed
User

ICC is a full time application that should be left running at all times. For that reason you must log in your user name prior to shut down. This prevents accidental closing of the application. If you attempt to close the application, this popup (bottom) is displayed. Enter your login name and password (if used) and select either:

Exit Application

(or)

Return to Application.



ICONS in ICC

Write data to file or transmit to field

Undo data entry

Save Data

Print a report (about this table)

Exit this popup screen

Open this file (or project)

Add an element

Delete an element

Run a "wizard"

Opens a supporting table so you can add new elements that connect to the parent table; when you close the supporting table, you are returned to the parent.

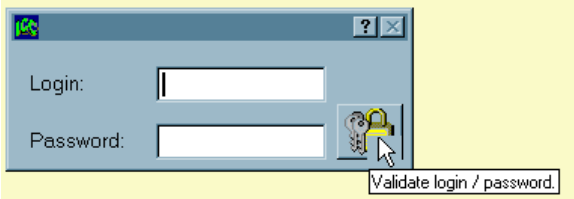
Confirm or acknowledge an alarm or event

Sample Now--interrogate a field unit for current data for the table displayed.

Export data to Excel spreadsheet.

Opens a notepad field that is attached to some element (e.g., program, main line, i/o).

Context sensitive on-line Help is available using the [F1]

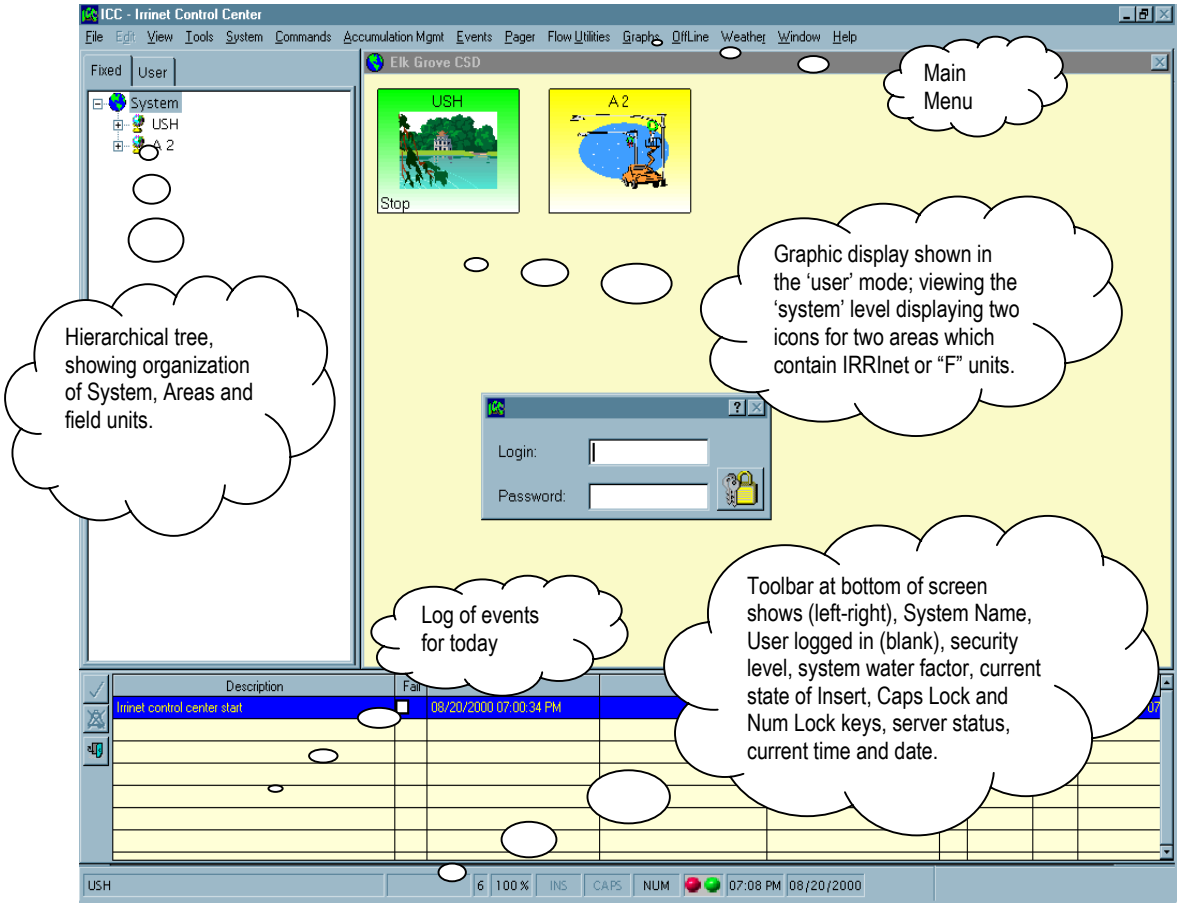


key on your keyboard or by selecting Help from the main menu of the ICC screen.

Many screens show a question mark icon in the upper right corner—left-click on this icon, release, then move mouse to a field and left-click again to pop up a help window regarding that field. Not all fields are enabled. "Tool Tips" are a form of help that you access by moving the mouse over a field in a screen and holding in position for a few seconds—after which a pop-up 'tip' appears. Example shown above...

Logging into ICC for the first time:

The supplier of your system should provide you with the initial login and password. Enter the Login name (default = ICC), the password (default = no password), and then click on the icon of the padlock with keys to enter the system.


ICC - Irrinet Control Center
File Edit View Tools System Commands Accumulation Mgmt Events Pager Flow Utilities Graphs OffLine Weather Window Help
Fixed User
System
USH
A 2
Elk Grove CSD
USH
Stop
A 2
Main Menu
Hierarchical tree, showing organization of System, Areas and field units.
Graphic display shown in the 'user' mode; viewing the 'system' level displaying two icons for two areas which contain IRRInet or "F" units.
Login:
Password:
Log of events for today
Toolbar at bottom of screen shows (left-right), System Name, User logged in (blank), security level, system water factor, current state of Insert, Caps Lock and Num Lock keys, server status, current time and date.
Description
Irrinet control center start
08/20/2000 07:00:34 PM
USH
6
100 %
INS
CAPS
NUM
07:08 PM
08/20/2000

At this point, please familiarize yourself with the screen above and the various functions displayed.

Fixed VS. User Screens:

There are two different views for ICC. Fixed and User.

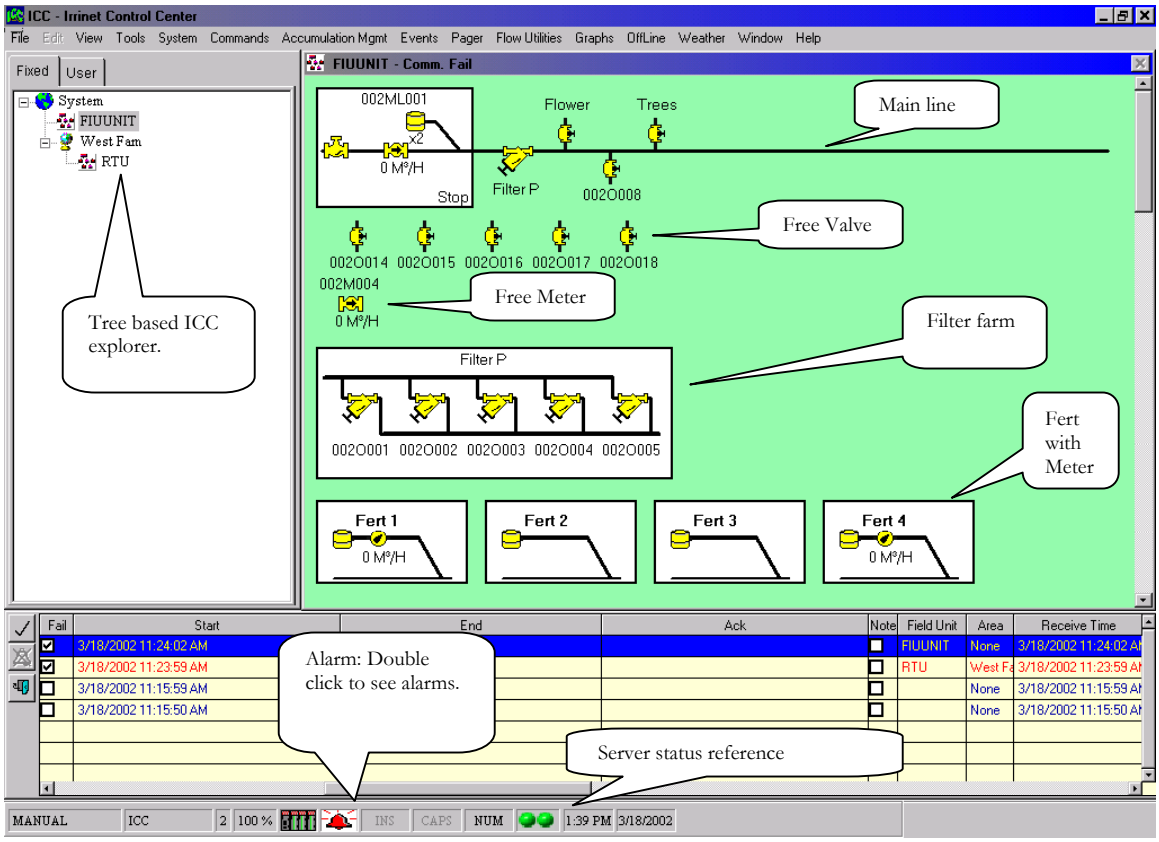
***NOTE: We will cover the User Screen in the "Customize your ICC section".
Fixed:

ICC fixed screen is a fixed screen where the icons are assigned and not manipulatalbe. In this screen you will be able to view status on valves, meters, lines, fertilizers and filters in real time. All the icons are neatly arranged and describe the health of your system in easy to recognize colors. There are nearly 30 icons pre designed and ready to be used in ICC. Here are some examples.

Of course operators can design and create their own icons. We will describe how in a little bit… Let us now look at a typical "Fixed" Screen.

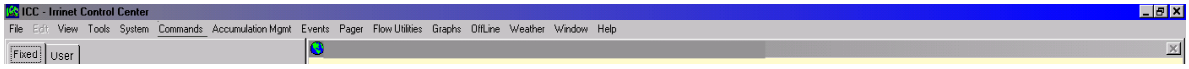
Fixed Screen

A typical fixed screen can look like the following.



ICC Menu

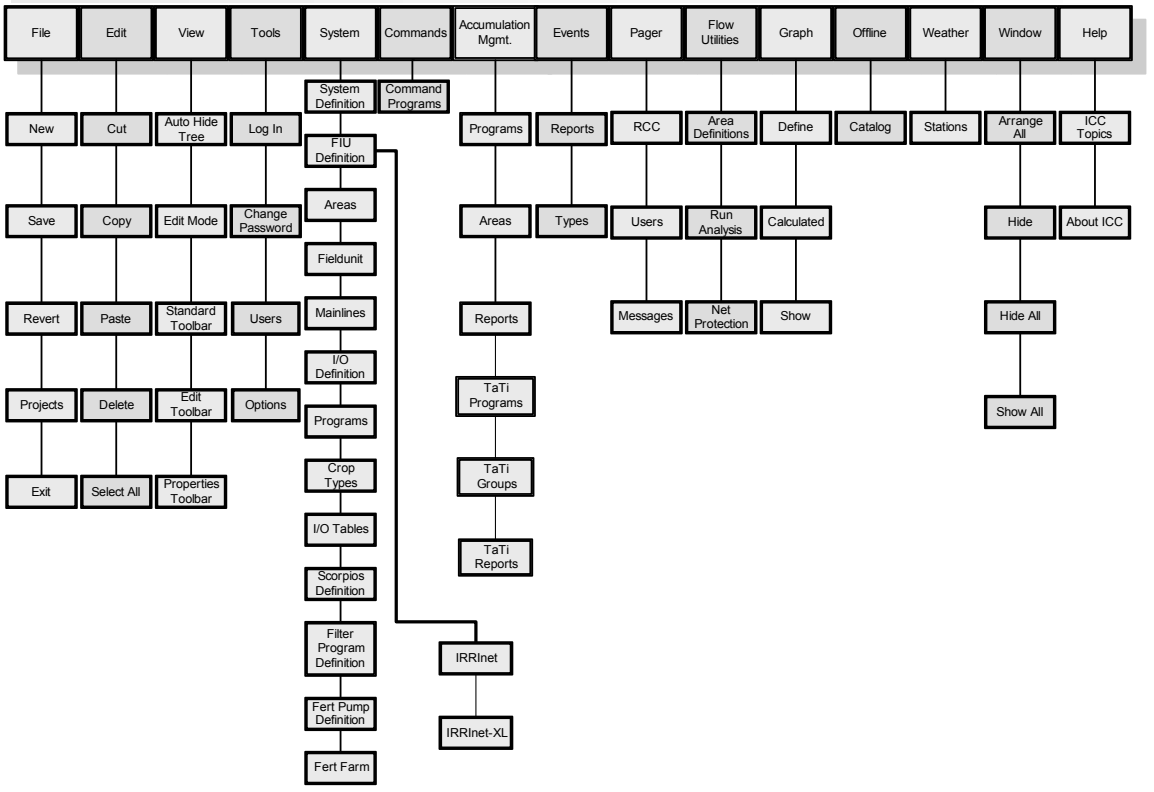
We will start by going through the menu from left to right.


ICC - Irrinet Control Center
File Edit View Tools System Commands Accumulation Mgmt Events Pager Flow Utilities Graphs OffLine Weather Window Help
Fixed
User

Navigation Hints Around the ICC Software

After log in, you may want to know "where to start first?" Depending on your experience, you may want to follow this systematically, or jump to any menu item. To go to a menu item refer to the following table to navigate around the software. An easier way to access the options of any item on your screen is to use the right click option. Just like any other icon within Windows, ICC allows you to access more details and options of a valve for example by right clicking on its icon and scrolling to options. We will review these options later in ICC.

IRRInet Control Center… 13.X



Menu Options:

The following table refers to the drop-down menus you see at the top of the screen. **Bold entries** indicate a Main Menu item. Items with * next to them indicate, they are only used in the user screen.

Menu Item	**"Path"**	
File	File	
*New	File/New	This option is used to add "Next Level" to the main tree in the user screen.
*Save	File/Save	When editing user screen you must save your changes before exiting. This is a great tool, for when planning your design of the User screen.
*Revert	File/Revert	This is an undo option in the Edit screen. By choosing this option you will undo the last action.
Projects	File/Projects	Opens the Projects table where you may create and/or open different projects. If you defined a project during the software installation, you probably will not need to access this table again as that project becomes the default project that is opened whenever ICC is started.
Exit	File/Exit	It is recommended to have ICC running at all times. ICC is an SCADA application, and if you choose to close it local programs (conditions) will not be sent to RTUs. Therefore if you choose this option, ICC will not allow you to exit without a password.
Edit	Edit	First go to View, select Edit (or press CTRL + E hot keystroke); this opens the graphics tools you can use to create your own "User" screens. Note that the Windows hot keystrokes for copy (CTRL + C), cut (CTRL + X) and paste (CTRL + V) may be used when filling in tables of information.
*Cut	Edit/cut	Use this option to "Cut" an item from the user screen, you must be in edit mode.
*Copy	Edit/Copy	Use this option to "Copy" an item from the user screen, you must be in edit mode.
*Paste	Edit/Paste	Use this option to "Paste" an item from the user screen, you must be in edit mode.
*Delete	Edit/Delete	Use this option to "Delete" an item from the user screen, you must be in edit mode.
*Select All	Edit/Select All	Use this option to "Select All" items within the window, when editing the user screen. You must be in edit mode.

View	View	Select Auto Hide Tree (the left-hand area of the screen that shows the hierarchy of the System, Areas, Field Units) or Edit Mode (for "User" screen creation).
Auto Hide Tree	View/Auto Hide Tree	Hides the Tree, displaying system, Area, and field units.
*Edit Mode	View/Edit Mode	Switches to the edit mode, aspirator may design and edit user screen when in edit mode.
*Standard Toolbar	View/Standard Toolbar	When in edit mode, this option hides the standard toolbar.
*Edit Toolbar	View/Edit Toolbar	When in edit mode, this option hides the Edit toolbar.
*Properties Toolbar	View/Properties Toolbar	When in edit mode, this option hides the Properties toolbar.
Tools	Tools	Select one of these options, Login, Change Password, or Options
Login	Tools/Login	Opens the login screen to change operators
Change Password	Tools/Change Password	User may change the login password for his account, using this option.
Users	Tools/Users	Add new users, and change rights for level 4 users. Level 2 and 3 users may use this option to unlock or change password for level 4 users.
Options	Tools/Options	Here you will be able to change the background color of ICC and setup DTMF options. ICC is also capable of displaying in nine different languages. You may choose your language preference, measurement (metric vs. U.S) and Astronomic clock.
System	System	Select from: System Definition, Areas, Field Units, Main Lines, I/O Definition, Programs, Crop Types or I/O Tables. Most of your setup work is done in these tables.
System Definition	System/System Definition	This option opens a window, which allows the user to choose default field unit types. Irrigation basis (one or two week periods). And system wide water factor.
FIU Definition	System/FIU Definition	There are two options, IRRInet or IRRInet-XL. Here you will have the options to setup the parameters for your FIU.
Areas	System/Areas	Opens a popup screen where you can create Areas used to group together field units. You may change the water factor % adjust and the icon for the area (when viewing "Fixed" graphics mode).

Field Units	System/Field Units	Opens the window for Field Unit's definitions. Contains 6 tabs that each needs to be completed. Note "wizard" icon in General tab that allows you to upload all parameters from a field unit that is already programmed in the field.
Main Lines	System/Main Lines	Opens the window for Line Definition. Contains 5 tabs. This is where you connect outputs to main line functions like main valve, irrigation valves, and fertilizer valves and determine the irrigation basis (time, quantity, etc.).
I/O Definition	System/I-O Definition	Opens the window for I/O Definitions. 3 tabs are shown. This is the "physical connections" information that connects the hardware inputs/outputs to the software or logical i/o names in the IRRInet field unit. You can sort the table by selecting one of the radio buttons (System, Area or Field Unit) as well as by I/O Type and sub-type.
Programs	System/Programs	Opens the window for Programs. Note that you can view all programs system-wide, or narrow your view by selecting the radio buttons for Area, Type or Field Unit. This is the heart of the ICC system where you will do a lot of work!. In ICC 11 the option for Fert programs can also be found here.
Crop Types	System/Crop Types	Opens the window for defining crop types. Crop types are attached to individual main lines and allow for water factor adjustments to be made to all main lines with a common "type" tagged to the main line.
I/O Tables	System/I-O Tables	This opens a window displaying both physical and logical I/O's in the system. The data is displayed by field unit, with individual tabs for Inputs, Outputs, Internal Conditions, External Conditions and Logic Condition Conditions.
Scorpio Definition	System/Scorpio Definition	This option opens the window in which you will define and address each Scorpio and assign them to their corresponding Field Unit.

Filter Program Definition	System/Filter Program Definition	A window will open giving you options to add your filter valves and flushing parameters for these filters. You will later have the option to add this filter to a mainline.
Fert Pump Definition	System/Fert Pump Definition	This window will give you the options for Fert output, and Fert meter. In the fertilize tab of this window, there are intricate settings for leak control, unopen Fert etc. You will later have the option to add this Fert to a mainline.
Fert Farm	System/Fert Farm	Using Fert Farm, ICC gives the user option of setting up a set of fertilizer pumps without association to a mainline.
Commands	Commands	Opens the popup screen for creation of closed-loop conditions driven by IF-THEN type logical statements from the central.
Accumulation Mgmt	Accumulation Mgmt	Select from Programs (linking i/o to accumulation areas), Areas (define accumulation areas) or Report (generate report or export to Excel).
TaTi Programs	Tariff Time Programs	In this window you will be able to create a set of schedule based on hourly, daily and monthly price of water to insure budgetary confinement. This Tariff calendar is based on annual bases and may be separated to multiple price structures for weekdays, weekends and holidays..
TaTi Groups	Tariff Time Groups	Create a set of Tariff programs and add them to a group for easier reporting using TaTi reports
TaTi Reports	Tariff Time Report	This window will allow you to create view and print reports from your past tariff programs
Events	Events	Select from Types (you can add or modify the text of the message, modify the value assigned to FAIL and OKAY which in turn is filtered by POPUP PRIORITY and PAGER PRIORITY to either "popup" a "new event" box on the screen and/or "page" one or more pagers)…or select Report to generate an Events Report.
Pager	Pager	Select from RCC (define pager service), Users (define subscribers) or Messages (write out your own message to be sent to a user)
Flow Utilities	Flow Utilities	Select from Area Definitions (define flow areas, outputs belonging and area flow limits), Run Analysis (flow prediction on one or more areas), or Net Protection (setup alarm limits for water distribution network).
Graphs	Graphs	Select from Define (setup data to be graphed), Calculated (define sensors with calibration equation) or Show (execute and draw the graph).

Offline	Offline	This is the "library" where data for each field unit is saved for later use in downloading. Select Catalog to open the popup. Select the field unit for which you want to view the file(s). Note that you can upload from an already-programmed field unit (same as "wizard" in field unit definitions). Make sure you save each field unit's data here.
Weather	Weather	This window will allow you to connect to a third party weather application and import ET value. Operator may also define minimum and maximum values for ET change by weather station here.
Window	Window	Allows you to hide all except the graphic display; Arrange All sets the windows back to default position; Hide will hide the one window selected; Show All will open all the ICC windows in their original positions and sizes.
Help	Help	Brings up the on-line help menu.

We will review the menu items that refer to the user screen, in the "User Screen" section of this manual.

Menu options, which relate to User Screen, will be reviewed in later section "Customizing your ICC"

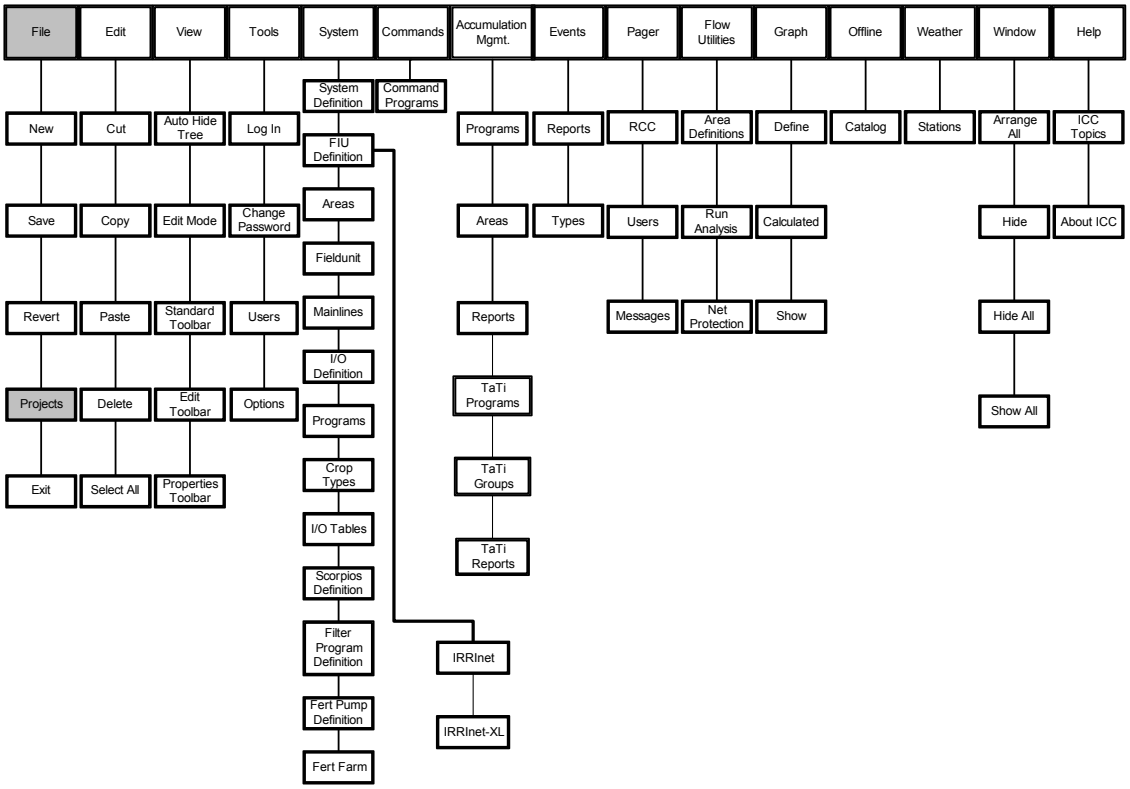
File:

Project

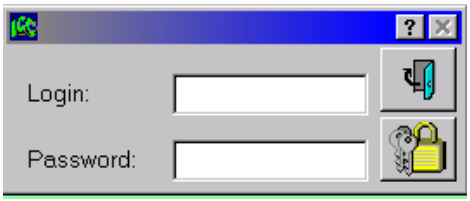
This option will allow you to change between multiple projects.

Click on File to expand the drop down menu. Click on Projects

IRRInet Control Center… 13.X



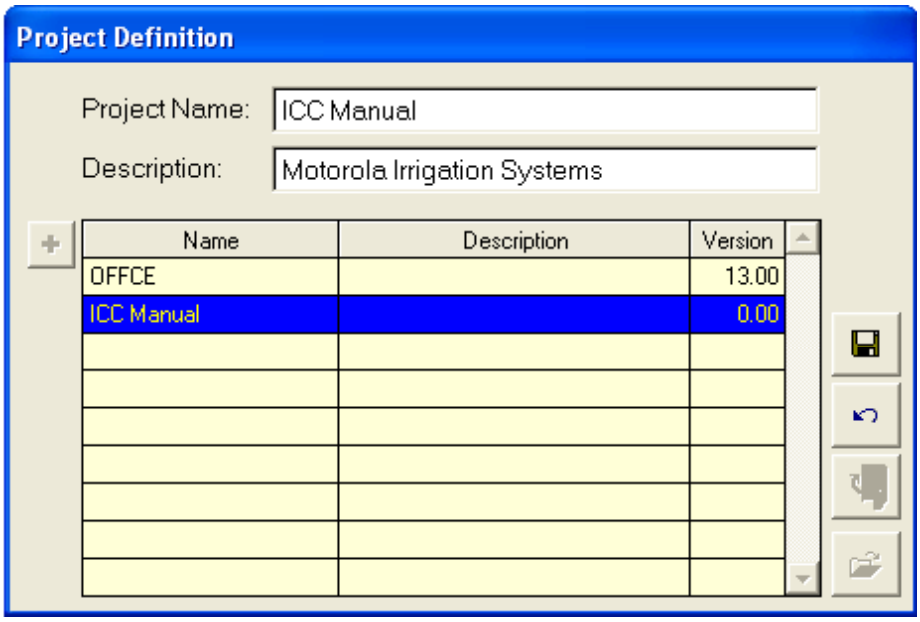
ICC will ask you to enter you password, in order to exit ICC and load a different project.



After entering your user Login and Password, you may click on the Door to exit or click on the padlock to continue with the current project.

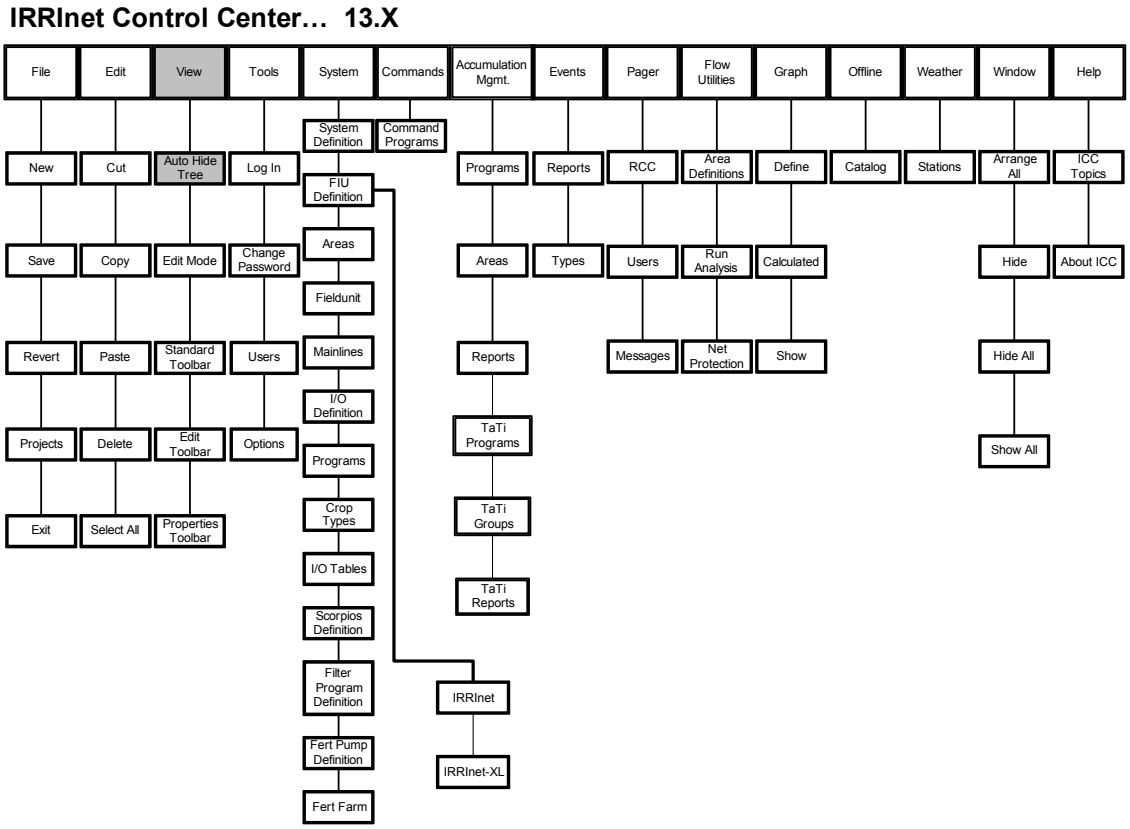
Click on the door to exit ICC. ICC will shut down and a new window will appear giving you option to either open an exciting project, or to create a new one.

In this screen you may click on the " + " sign to create a new project, or click on an existing project and click on the folder button to open that project.



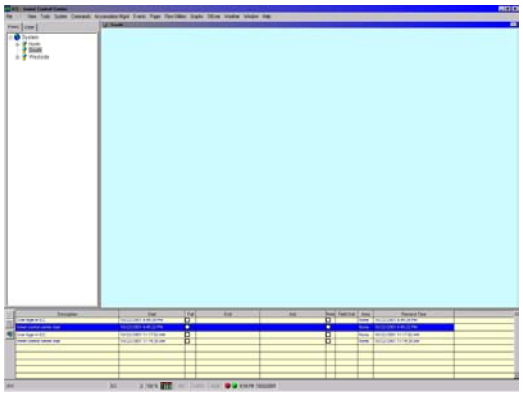
View:

As its name explains "View" allows for changing of the view of ICC.

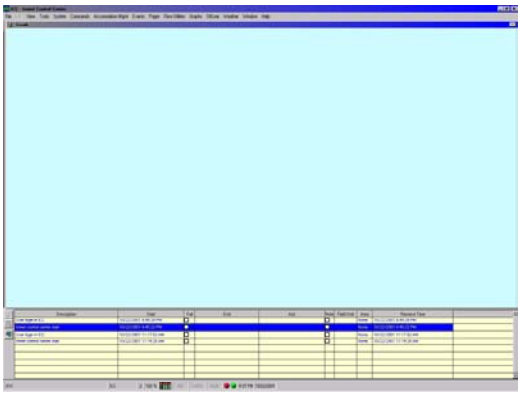


Auto Hide Tree:

When checked the tree structure hides in the left panel of the monitor, thus creating a larger real state for viewing ICC.



"Auto Hide Tree" NOT checked



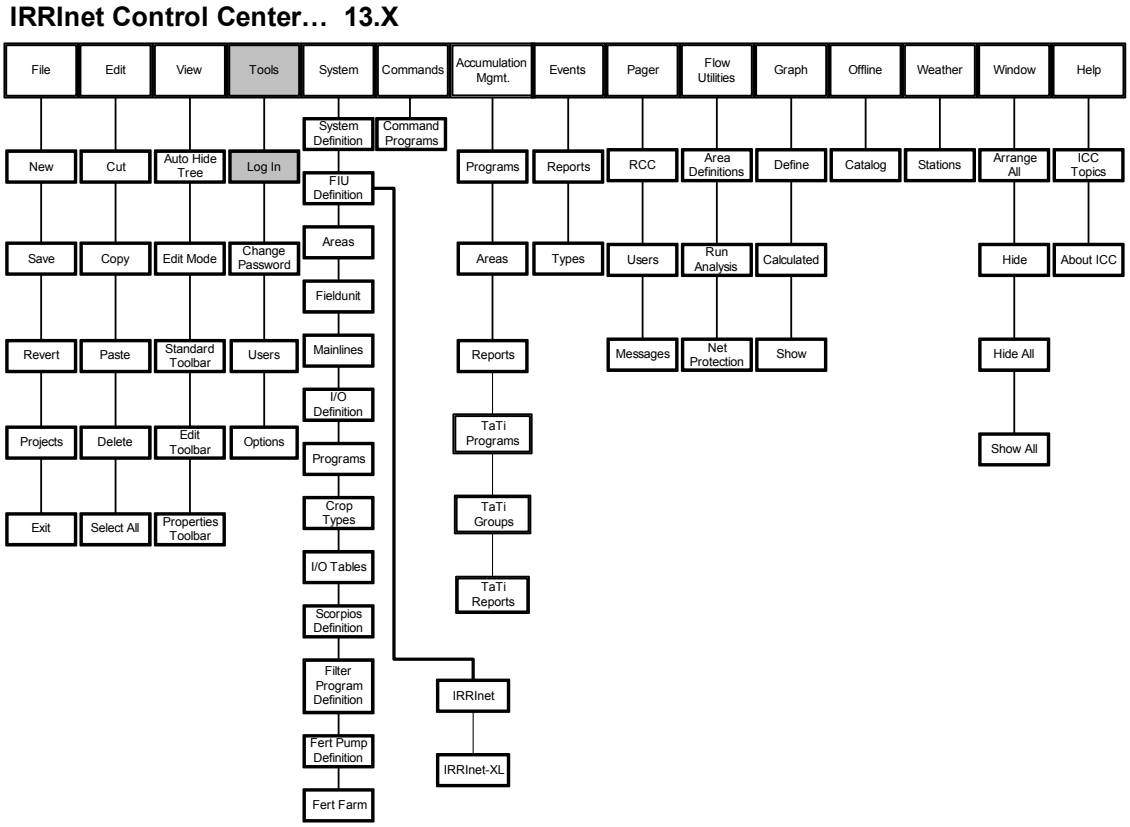
"Auto Hide Tree" Checked

Tools:

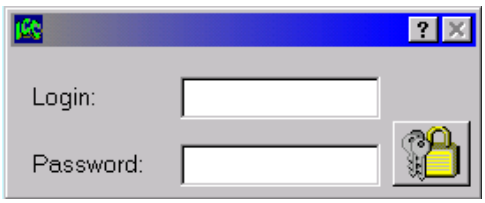
Tools menu displays ICC security options, these options are actually when you have more than one user operating ICC.

Log in:

For security you should always lock ICC when walking away from the computer. To do this simply clicks on "Tools" and then click "Login".



The Following Screen will appear.

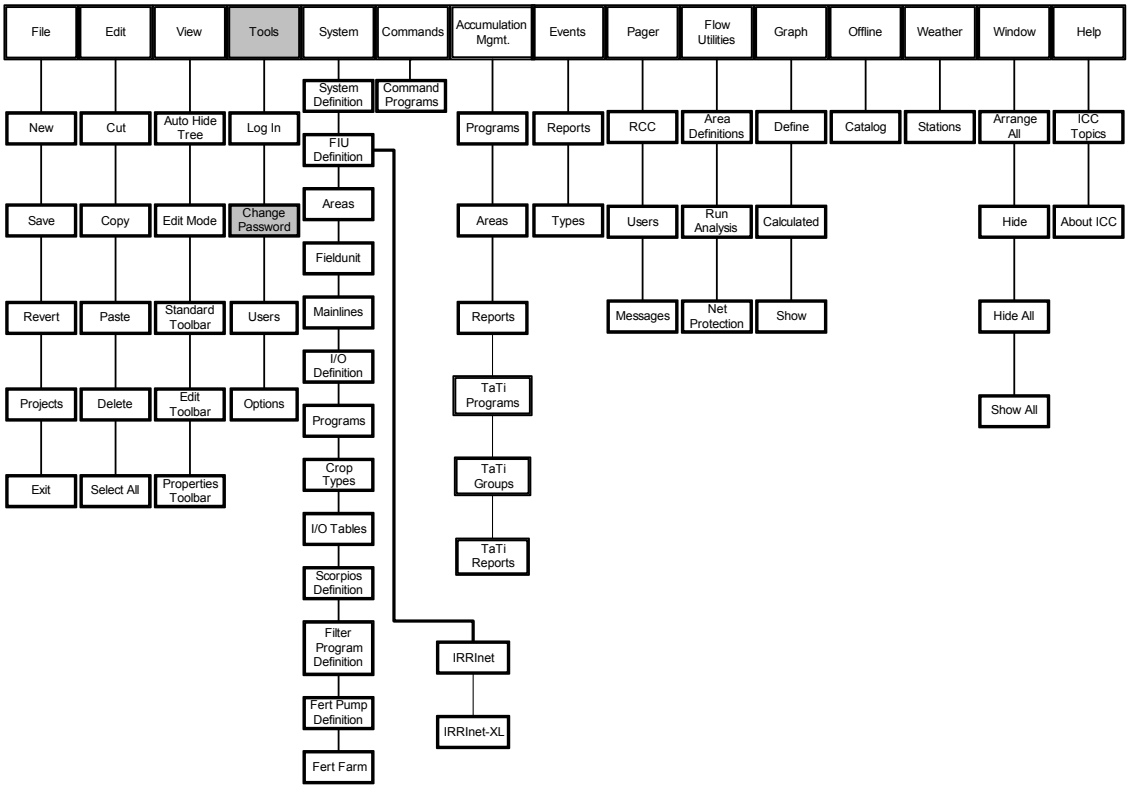


When you return to the computer simply type in your "Login" and "password" and click on the padlock.

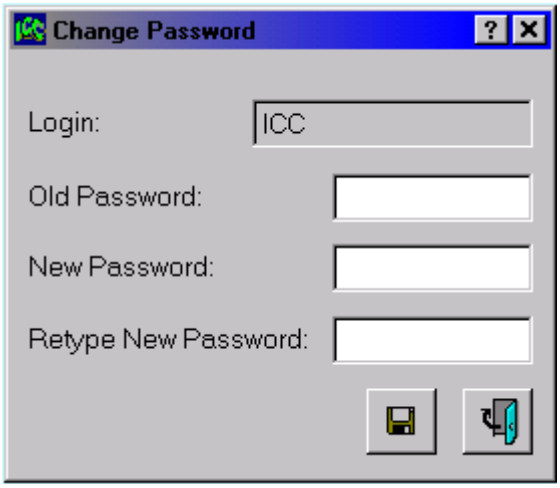
Change password:

The next option on the "Tools" menu; this option will allow the current user to change his password. It is recommended by Motorola to change your password often.

IRRInet Control Center… 13.X



To change your password, click on Tools, and then click on Change password.



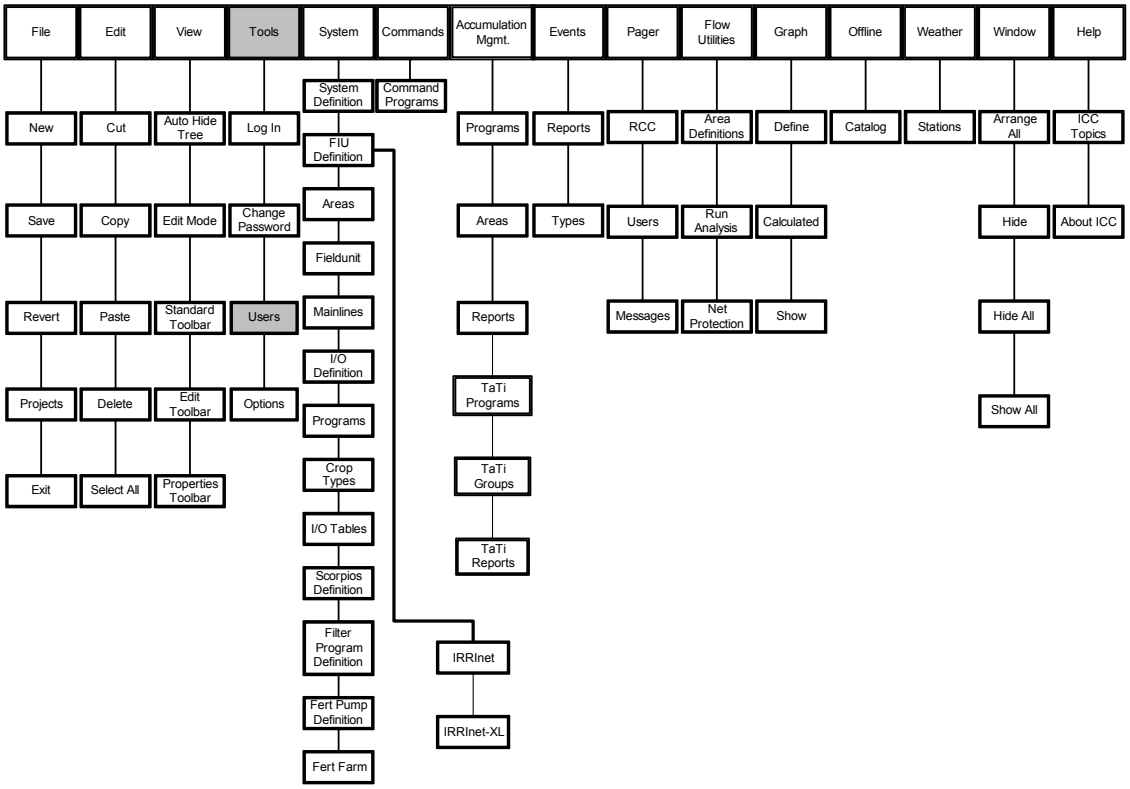
Type in your old password, and press Tab to jump into the New Password field. Create a new password, make your password complex to figure out don't try using your name or favorite football team, try combining letters and numbers. After retyping your new password click on the "Save button".

Users

ICC is a multi level security software. It allows for master accounts for users who would then have access to all options. To simplify such accounts Motorola has created user levels numbering from 2 to 5.

To access "Users" click on Tool and then users.

IRRInet Control Center… 13.X



This table allows you to create login account and assign their level of access.

Definitions:

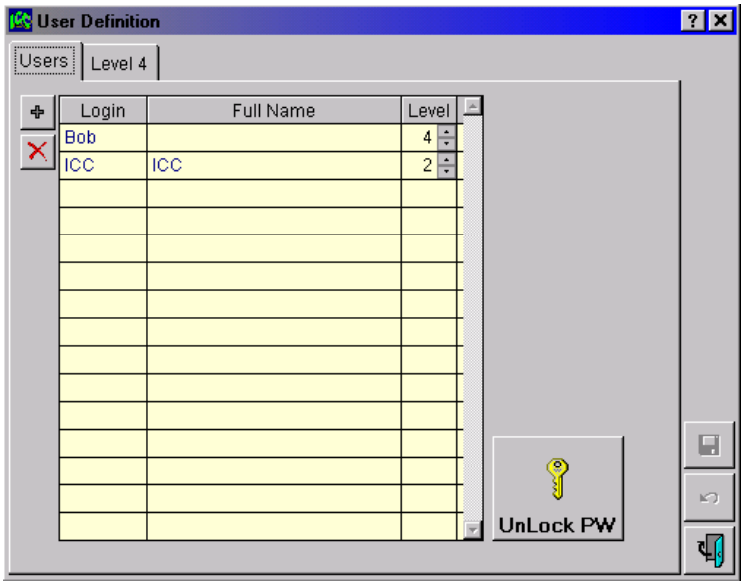
Level 1: Motorola technical support only

Level 2: System Administrator can change system level parameters and security setup shown here.

Level 3: Can add I/O, make definitions to field units, modify and add programs. Cannot change system level parameters.

Level 4: use this level to separate users' access by areas of field units and other parameters (similar to level 3 but assigned by Areas to each user's login (see next screen, Level 4).

Level 5: view only, cannot change or define new elements.

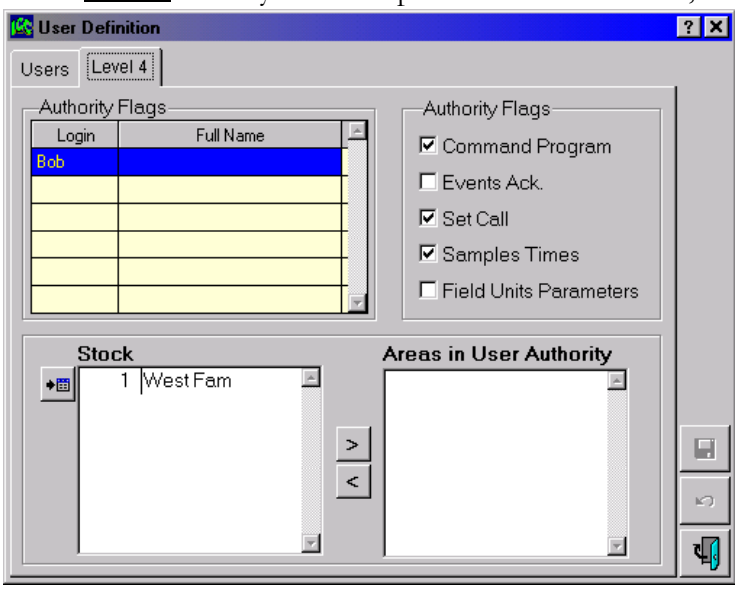


You may delete any user by highlighting the user entered then click on the delete icon.

If a user has forgotten a password and you (using level 2 access) need to "unlock" it, click on the button shown in the lower right corner of the screen

Level 4 Tab

The tab Level 4 allows you to set up individual users' access, dividing your system



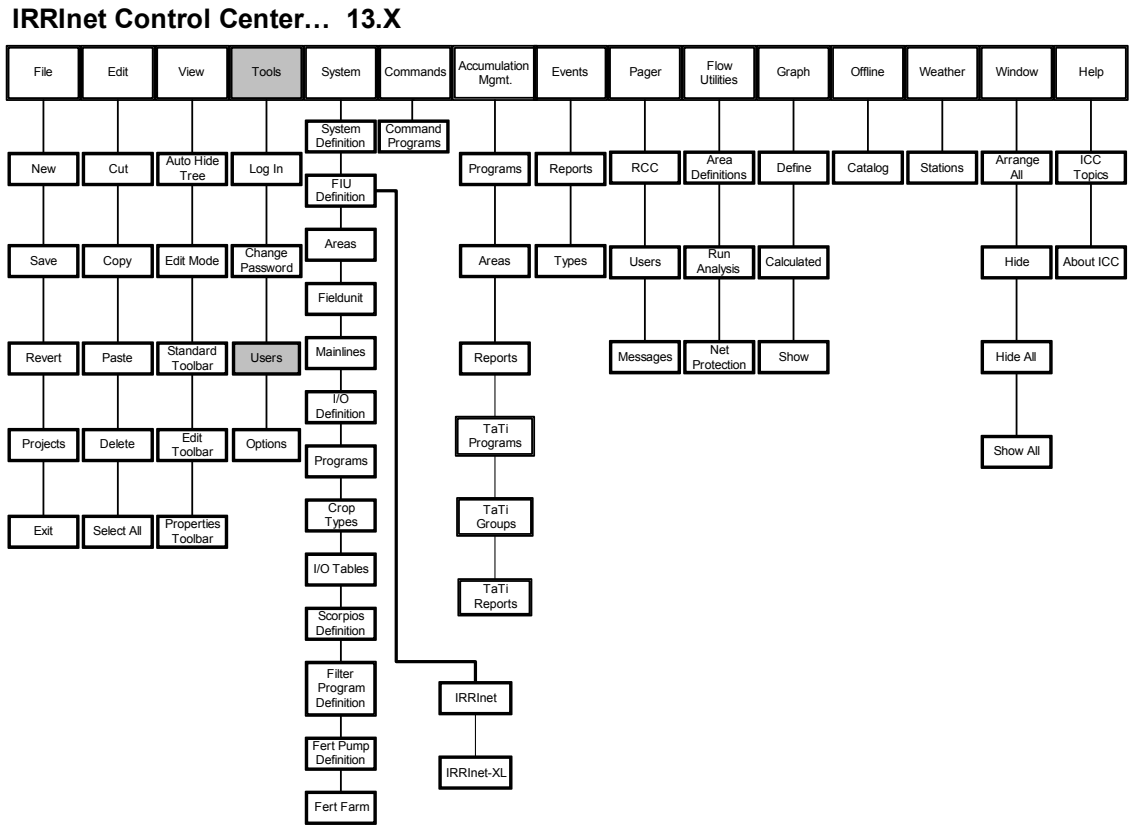
into areas that are comprised of one or more field units. You may further restrict the access by selecting the Authority Flags as shown here. Fore example we chose to give Bob access to west farm with rights to commands, set calls, and samples times.

Assign one or more areas by moving from the Stock to the Areas in User Authority.

You may do this by clicking on the Item in the stock and then clicking the right arrow.

Options

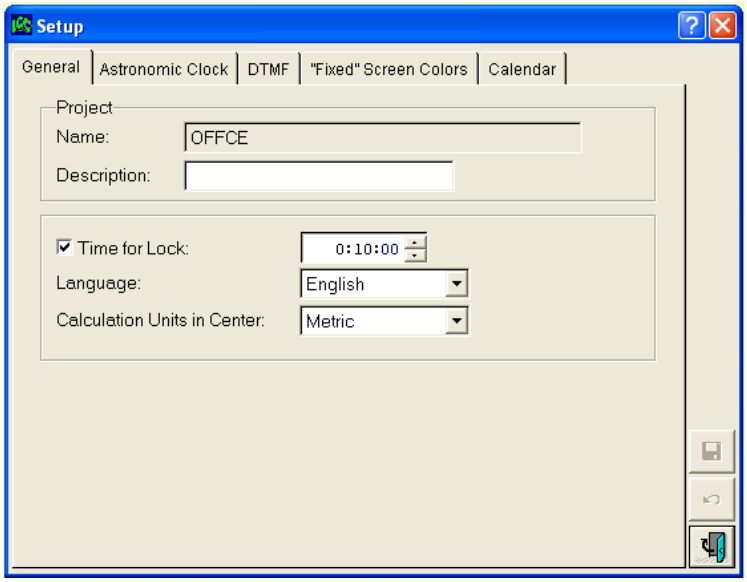
With in this window, there are 5 Tabs, each one of these tabs are separate part of ICC. To access the Options click on Edit in the main menu and then click



Options. A new window will appear, the tab highlight first is the General Tab:

General:

You may view or change some General information about your system or project in ICC from this window. If any option is changed in this window you must save before returning to the main window by clicking on the save button.



In the project section of this window you may change the description, please note that the Name of your project is not changeable.

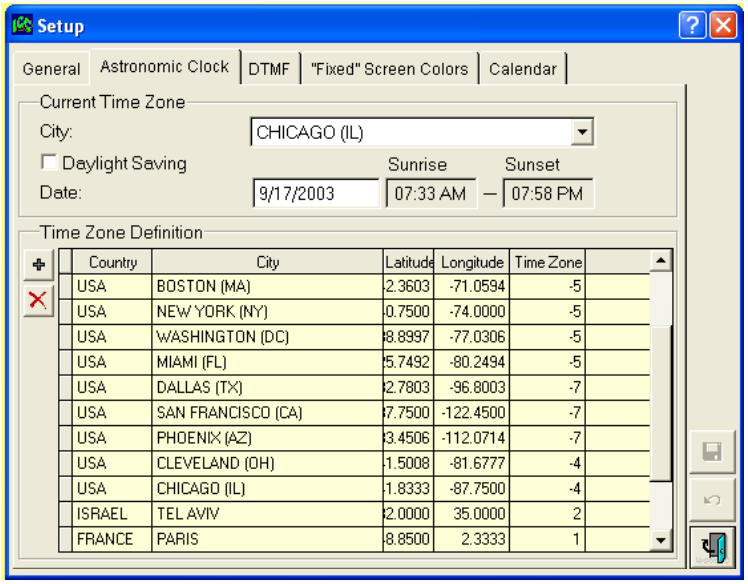
Time for Lock: Allows you to define the time for ICC to prompt for user login and password. ICC starts measuring this time from the last movement of mouse or use of keyboard. It's important to note all ICC local programs will be still running even though ICC is locked. To set "Time for Lock" check the flag and enter the appropriate time.

Language: ICC 13.0Xsupports eight different languages (English, French, Italian, Spanish, Swedish; German; Portuguese; Hebrew and Arabic). Before changing from one language to another the user must have the fonts for that language installed on the computer. These fonts may be found at Microsoft's web site, www.microsoft.com.

Calculation Units in Center: There are two options in this drop down menu, Metric or U.S. If this option is changed all values in ICC will change. This affects the displayed units of measurement in the central, regardless of the units used in the field units.

If you have made any changes in the General tab, you will need to save the data before accessing the other tabs.

Astronomic Clock:



City (Current Time Zone)

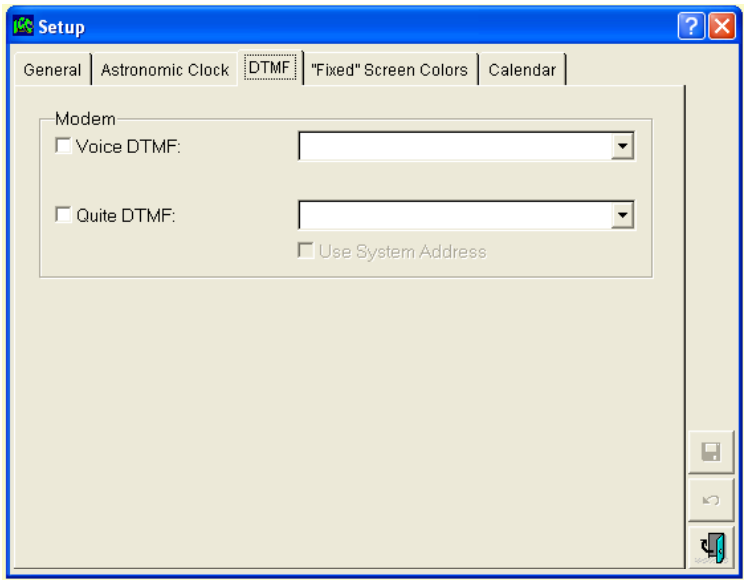
The use of an astronomical clock will allow you to coordinate certain events conditional upon the time before/after sunrise/sunset. If you do not find a city close to your location, the lower part of the screen, "Time Zone Definition" allows you to set the latitude/longitude for your city.

If your city location was not listed or requires correction, the table at the bottom of the screen allows you to make the settings unique to your locale.

Note that you can add a City as well as highlight a cell of information and change the data. The latitude and longitude should be checked for your city--adjust as needed. The Time Zone refers to how many hours ahead (add hours) (East) or behind (subtract hours) (West) UTC Greenwich Mean Time is compared to your location.

DTMF

The ICC software allows you to use one of two modes of remote control,



otherwise known as "DTMF" (dual tone multiple frequency).

Before checking the box for Voice or Quite DTMF you must choose the type of DTMF from the drop down menus.

Voice DTMF or Two-way DTMF

This mode features voice prompted operation. You place a telephone call to the central; the ICC software "answers" the phone then prompts you for password. From your telephone, you use the number keypad to enter numeric codes as prompted by the ICC software. If you have a voice + data modem installed, you will be able to select which modem you will use for DTMF operation (remote control of the system).

Note: Your password is the same as the password in ICC. Make sure your password is numeric not alpha numeric for DTMF Two Way to understand your log in.

Quite DTMF

Quite DTMF is for inbound only tone commands, usually sent over a two-way radio to the IRRInet or IRRInet-XL FIU's base station radio. For Quite DTMF, select a COM port from the drop down menu first then check the flag for "Quite DTMF". Make sure the COM port you have assigned is the port to which you have connected a modem. A junction block will need to be provided that allows you to connect the "handset" port of the modem (not the TELCO port) to the microphone port of the radio. The center two pins of the RJ-11 cable connecting to the modem should be connected to Audio Receive and Ground coming from the microphone port of the radio.

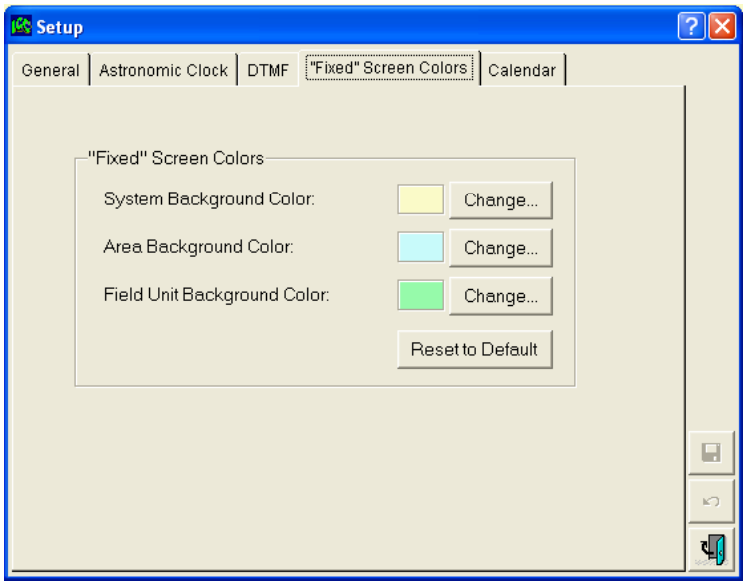
The table that follows provides the method for entering the one-way DTMF commands.

DTMF Codes Table

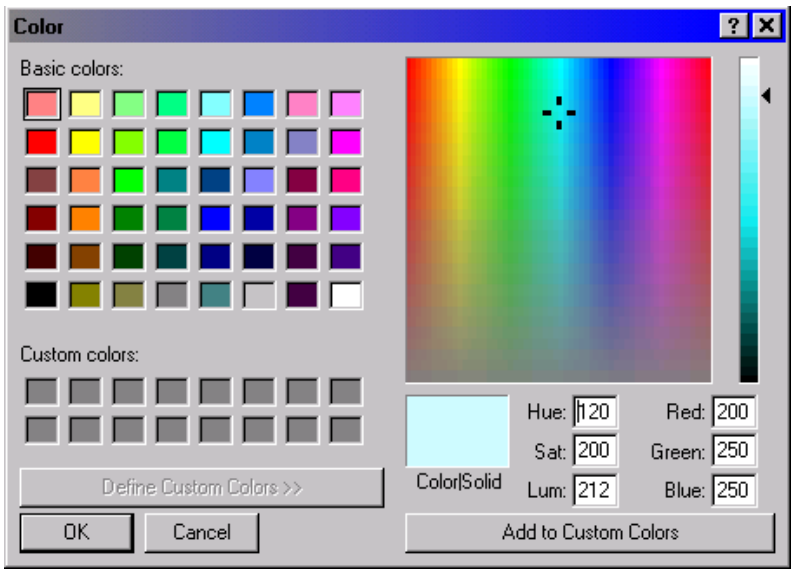
Start with…	Address…	Operation	On…	Which way	Finish with…
#	0001-0999 (field unit number)	2-External condition	001-064 Condition Number	0=off 1=on	*
	(or)	4-Irrigation Program Status	001-200 Program Number	0=irrig today 1=irrig now 2=clear alarm	
	3001-3036 (area number)	6-Main line status	001-099 individual main line or 999=all lines	0=stop 1=run	
	(or)	7-Change water factor	0001-0999 water factor value		
	4000 (system)	8-Manual operation	001-250 individual station number, 999=all	0=close 1=open	

Fixed Screen Colors:

Use this option to change background colors in ICC. To change colors simply click on the button of your choice, for example to change System Background



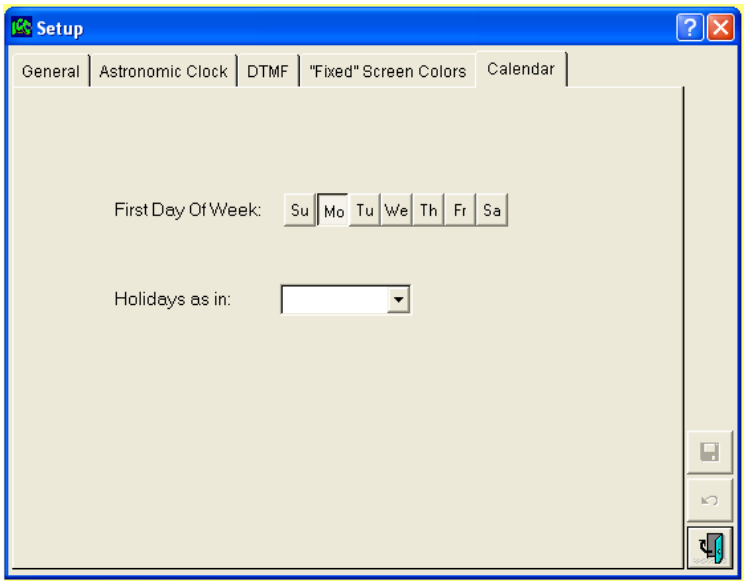
Color click on the change button in front of it. A color matrix will appear allowing the user to choose from one of 60 different colors. There are over 250,000 different color possibilities if the operator chooses to create a custom color.



To create a custom color, click on change for any of the 3 options. A window will appear with a list of common colors will appear, you may choose one by clicking on that color. To define a custom color, click on "Define Custom Colors".

By moving the mouse on the color matrix and changing the shade from the right column you may create a new color. Once satisfied with the color appearing in the "Color/Solid" box click on "Add to Custom Color" to add.

Calendar:



First Day of the Week: ICC TATI programs require you to define the first day of the week for calculating TATI. Since ICC is used worldwide you need to define the first day of the week at which you want TATI to start its calculations.

Holiday as in: This option does not exist in ICC 13.X and should be ignored!

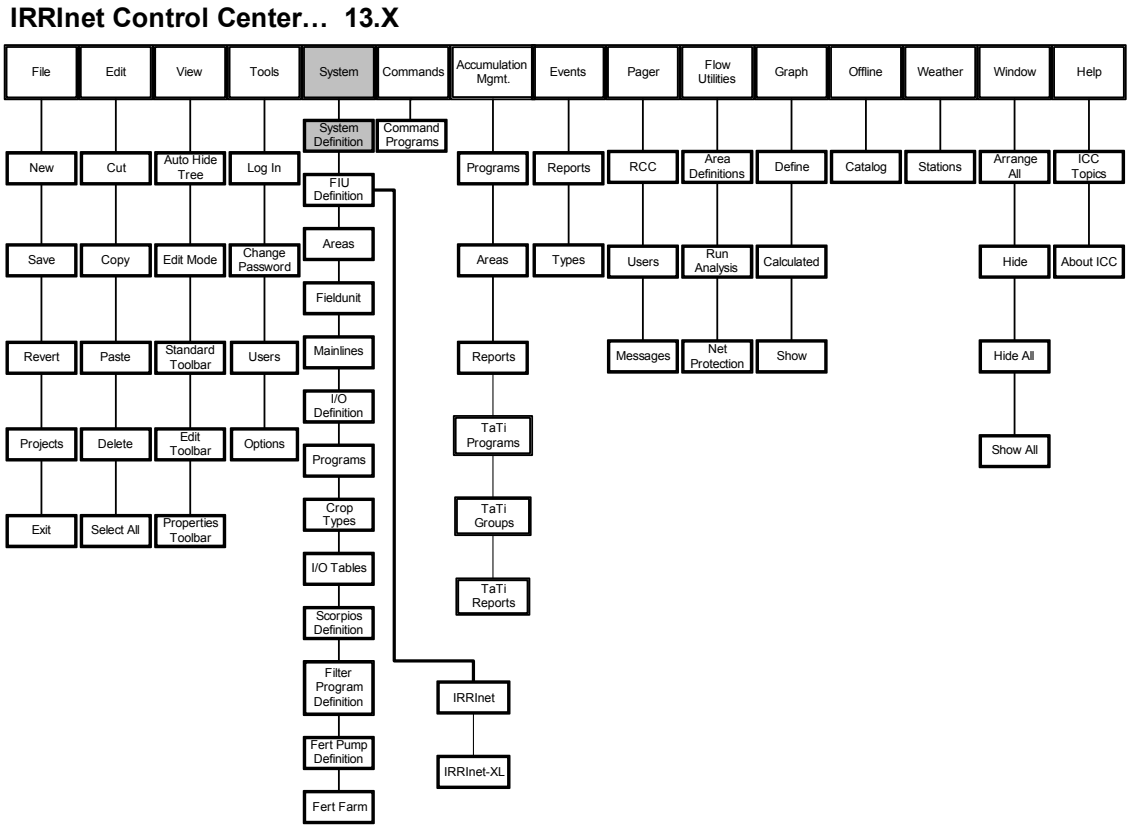
System:

System is one of the most used tabs in the ICC menu. Here the operator will be able to set FIU settings, program outputs, inputs, sensor and much more. We will discuss these options in detail.

System Definition:

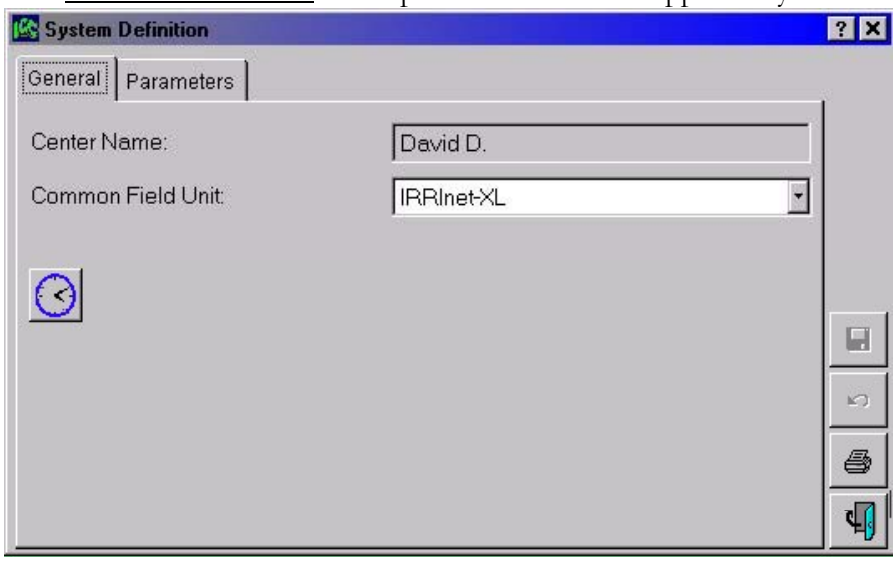
System definition will give the operator ability to set general settings for the whole system. For system Definition choose system form the menu and click on System Definition.

There are two tabs, in this window.



General:

Common Field Unit: The operator will have the opportunity to choose the most



common field unit in the system; this option saves one step later, when adding a field unit. To change common field units simply click on the drop down menu and choose a different unit.

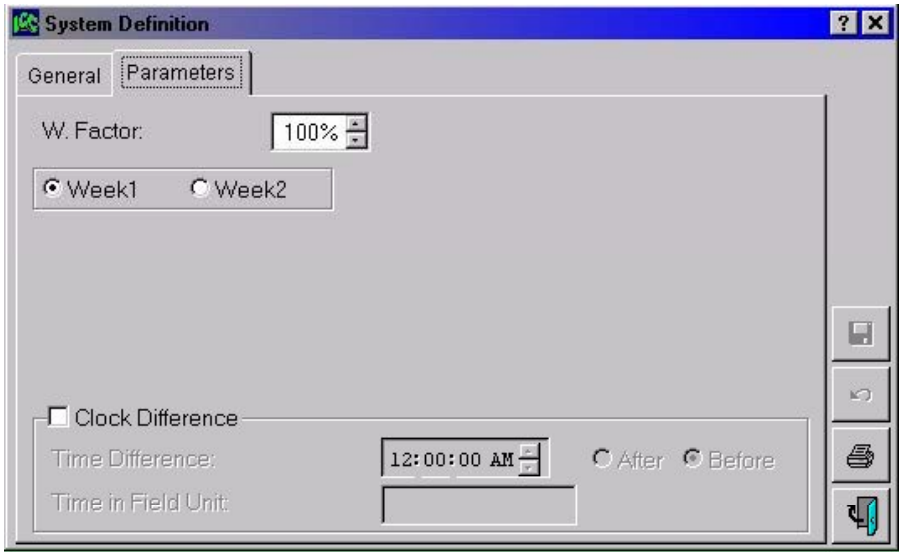
Clock: In the bottom left corner there is a clock. This clock is a push button, and when clicked will synchronize the system clock to all the RTUs in the field. The central sends the local computer time to all field units. It's a set call, 5 times one minute a part (non acknowledged)

***Tip: the alarms from field units come with unit time, look at the time of the alarm and compare it with the local time on your computer system tray.

If you have made changes in this window you must click on the save button to go on

.

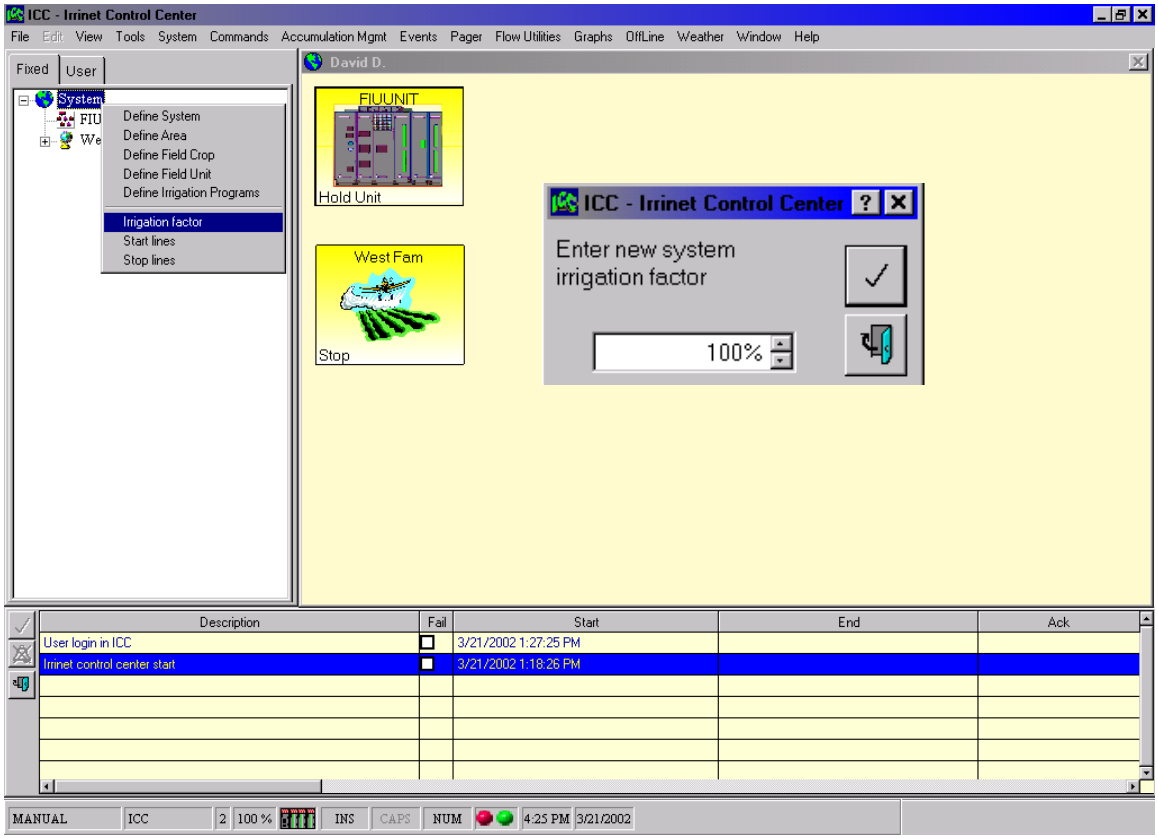
Parameters:



Click on the parameters tab:

W. Factor: changing water factor is a major change to the system; you will be able to set the system water factor from here. Or use one of many short cuts. In the next page we will review some of these short cuts.

To change the water factor for the system you may right click on system in the fixed screen and choose "Irrigation Factor "



The water factor for the system is displayed on the system tray; you may double click on this value, which opens the water factor window.

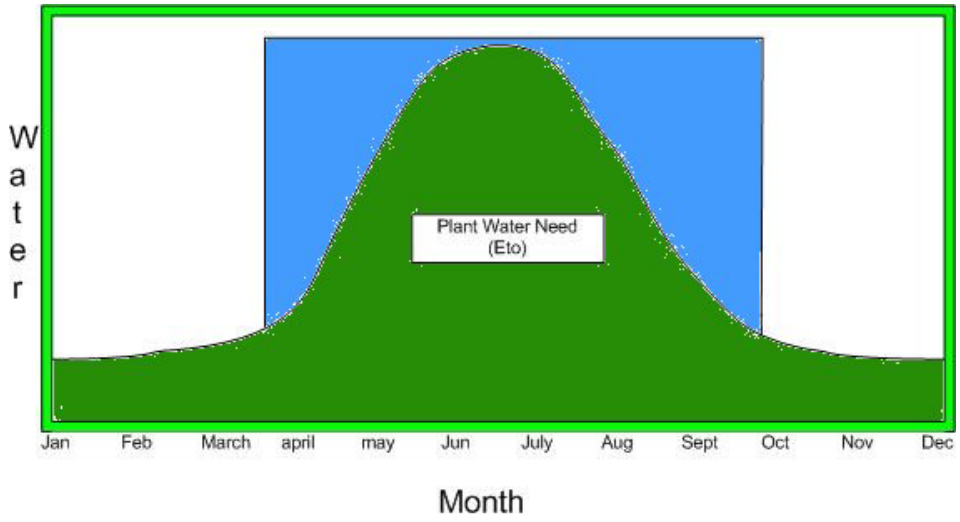
Before we go on let's examine and explain what water factor is and what is its functionality in ICC.

Water Factor: is a way of simplifying and translating *ETo to a percent value.

*ETo, or reference evapotranspiration, is one of the most important things to consider when scheduling run times for your irrigation system. The problem is, most people have never heard of ETo or considered it when irrigating their landscapes. Fortunately, it is a fairly simple concept that can save you money.

ET Explained:

Evapotranspiration is the combination of water that is evaporated and transpired by plants as a part of their metabolic processes. "Reference Evapotranspiration" or "ETo" is simply the amount of water needed in a year of average weather. The graph bellow illustrates the concept. The green area labeled "Plant Water Need" represents ETo. Notice that as the days get longer and warmer from March to



July, ETo, or the plant's need for water, gradually increases.

The blue area represents a very common, but incorrect, watering practice, where the irrigation system is turned on full bore around March when rain usually ends. The system is then left running for peak summer water needs until well into the fall when it begins raining again. Remember that in the fall, though the afternoons may be warm in Marin, the days are much shorter and the growing season is ending for most plants. Therefore, plants need much less water.

The efficient irrigation scheduling technique is to readjust the system run times to match the actual plant water need curve shown on the chart. The blue area represents wasted water and money.

This assumption is based on an "average" year of weather, but in reality the weather can be variable. Sometimes it's hotter, colder or rainier than in an "average" year of weather. That's why you should monitor weather information including temperature, humidity, and wind. Based on actual weather conditions, the operator should evaluate how much water is needed to replace the water that is used by his plants.

Water Factor: Makes this system change based on ETo very easy to manage. ICC implements the water factor change based on ET if you have a weather station, rain sensor, rain buckets and limitless more options.

The operator may change the Water factor percent by either changing the WF of the whole system, Area, field unit, crop type or even one single main line. Which bring us to priority of WF in ICC.

As we just mentioned the operator has many options in changing WF in ICC. However there is something that needs to be taken into consideration. One of which is priority. Lets assume we want to change the WF for a main line to 20% but the system water factor is set at 80%, what should change the water factor of the main line to? The answer is 25%!!!

Since our system water factor is already at 80% we need to set the main line to 25%. This will give us a line factor of 20%.

The priorities are as follows.

System

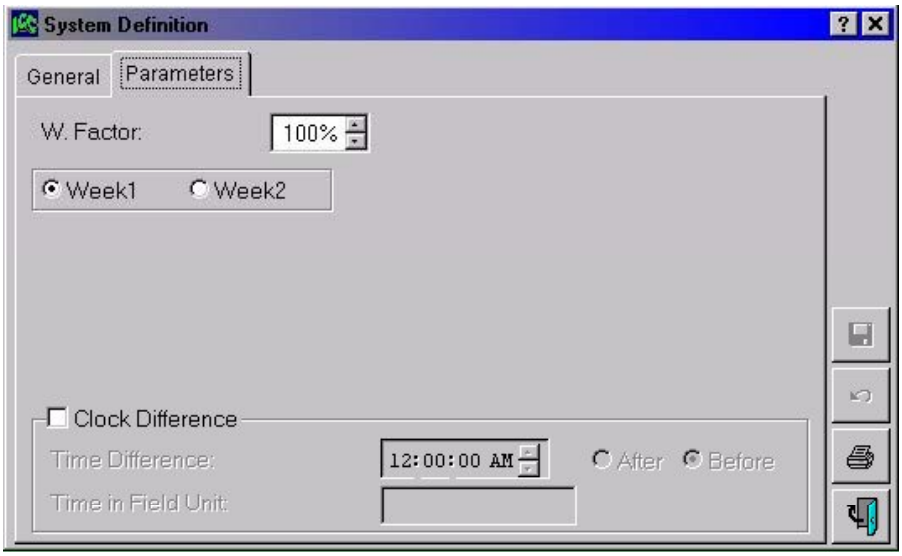
Area

Crop Type

Main Line

NOTE: It is critical to pay attention when you are editing the water factors. If we change the water factor of the system to 50% and change the water factor of an Area to 50 % and again change the water factor of a main line under that Area to 50%. We are now irrigating 50% of 50% of 50% (which means you are now watering 12.5% of the actual irrigation values). Keep in mind that water factor can be also changed by the weather station. If the weather station also changes the system water factor, the final water factor will be dramatically changed.

Week1 and week2: ICC 11 allows the users to write irrigation programs based on two-week intervals. By choosing Week 1 or Week 2 here the operator may switch between weeks of irrigation. Week one would tell the programs to start week 1 and week 2 will switch the programs to the second week of irrigation.



Clock Difference: Checking the flag here the software will allow for the operator to set a time difference between the local computer and all the RTUs. This option comes in handy if the central computer is in a different time zone than the RTUs

FIU Definition:

In ICC 13.0X a system may be IRRInets only, IRRInets and XL/XM units or XL/XM units only.

IRRInet: (SUPER CPU): These units communicate over Motorola INTRAC protocol. This same protocol is used to communicate with Scorpios in the field.

XL/XM (CPU420) These RTUs communicate over MDLC protocol, which is a 7 layer, 128 bit encrypted protocol!

Since the language these RTUs use to communicate is different from each other two separate FIU is used in the central and both FIU will be connected to the ICC computer VIA serial ports. ICC will then use the XL/XM FIU to communicate MDLC with XL/XM RTUs in the field and the IRRInet FIU to communicate with IRRInet RTUs.

However if your system only consists of one type of such RTUs; all IRRInets or all XL/XM then only one FIU will be required.

Different settings for FIU. FIU (Field interface Unit) is the IRRInet or IRRInet-XL that will allow the ICC (in the computer) to communicate with the RTUs (Remote Terminal Units) in the field. The concept is easy, data is sent from ICC through the computers COM port (usually COM1) via RS232 to the CPU of the FIU. However the new IRRInet-XL uses a different communication protocol than IRRInet to communicate with the RTUs in the field. The name of this protocol is MDLC. There are 3 different scenarios that we are going to go through, and they are as follows.

Entire system is made of IRRInets.

Operator must install and program an IRRInet FIU.

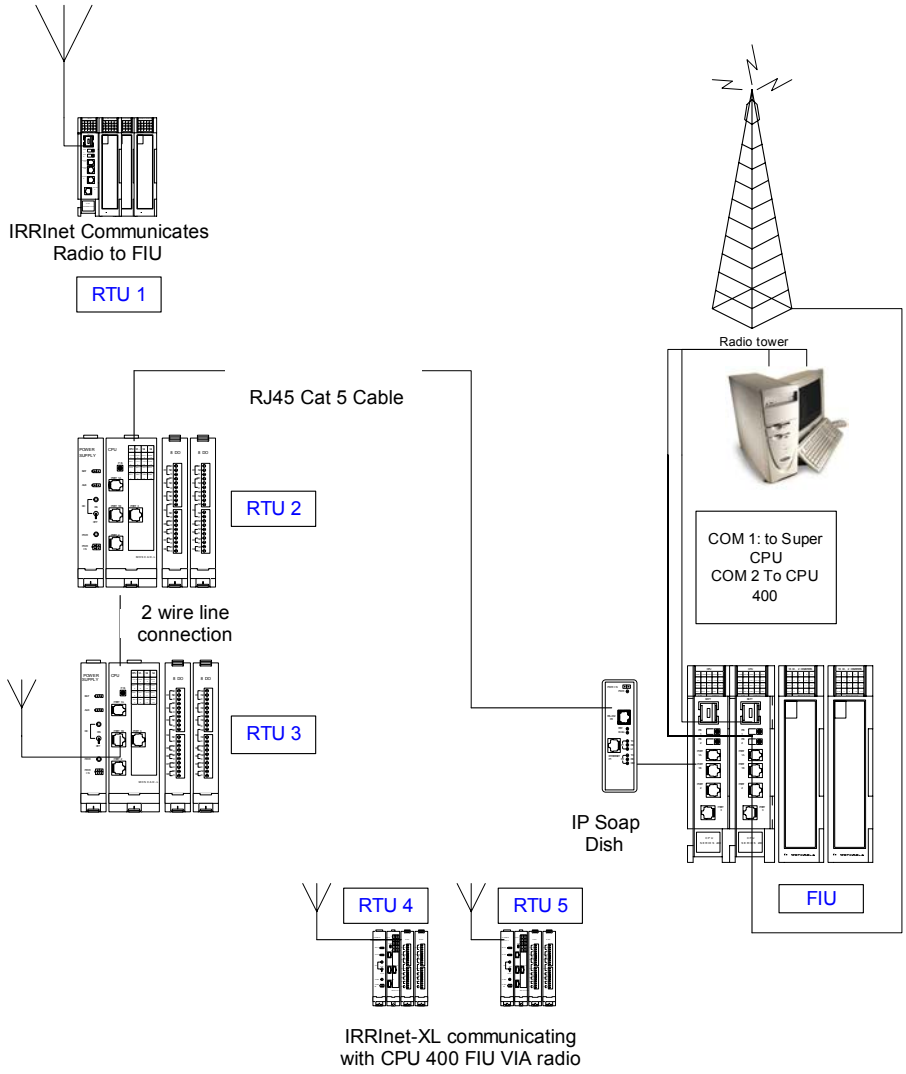
Entire system is made of IRRInet-XLs.

Operator must install and program an IRRInet-XL FIU

The system is a combination of IRRInets and IRRInet-XLs.

Operator must install and program an IRRInet and an IRRInet-XL (CPU420) FIU CPU's on the same motherboard, program them, and connect both via RS232 to the computer.

We are going to cover the programming of each CPU separately. Based on this



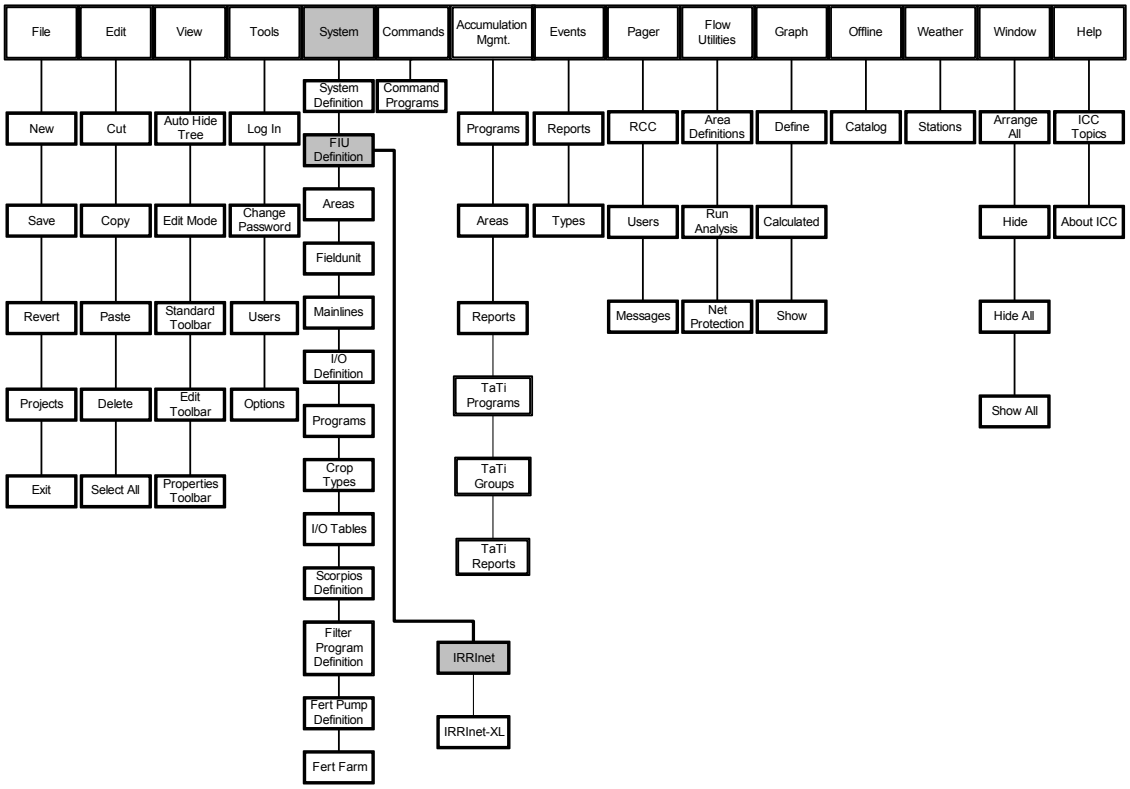
knowledge consider the following.

The illustration shows a system witch consists of both IRRInet (RTU 1) and IRRInet-XL (RTU 2 - 5). Therefore we will program ICC to communicate with both IRRInets and IRRInet-XLs in the field. However, IRRInets and IRRInet-XLs do not speak the same language, therefore we need to place both an IRRInet -FIU CPU and an IRRInet-XL FIU CPU (CPU420) on the FIU motherboard.

IRRInet:

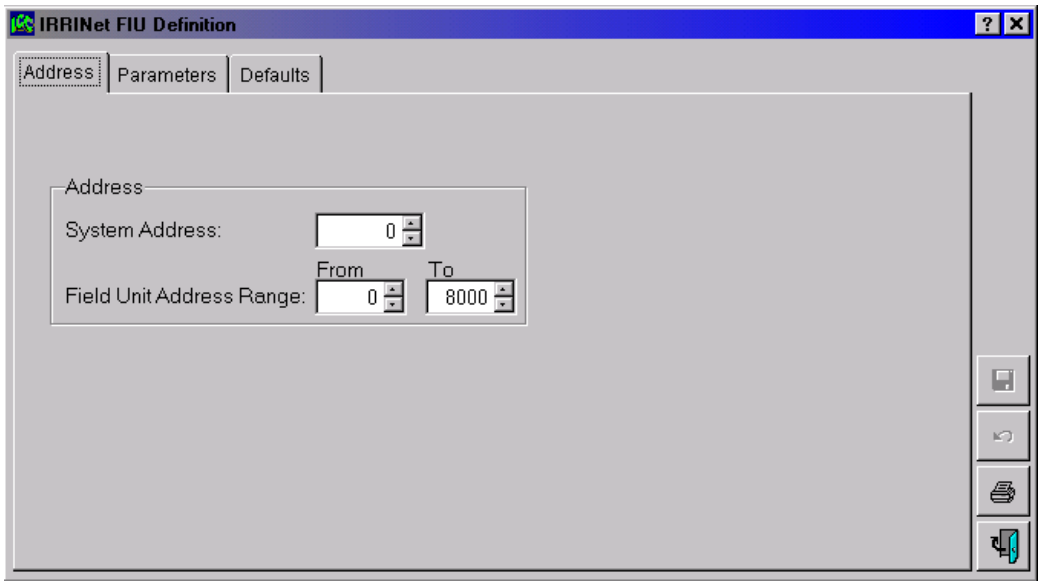
Click on System on the main menu, click on FIU definition and choose IRRInet.

IRRInet Control Center… 13.X



A new window will open with 3 tabs.

Address

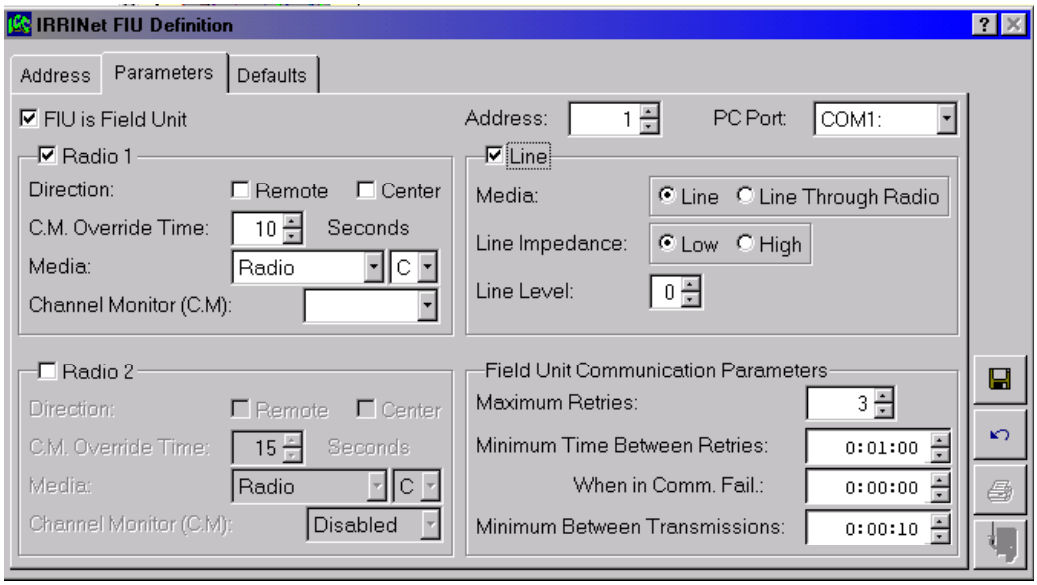


System Address: choose a numeric address that would fall with in the range of Field Unit Address Range. Any other field unit may not use this address. The system address must also be greater than zero.

Field Unit Address Range: This is a range you may choose for your field units. Each filed unit will have a unique number, which cannot be used by any other field unit. The addresses chosen for the field unit must fall within this range.

Parameters:

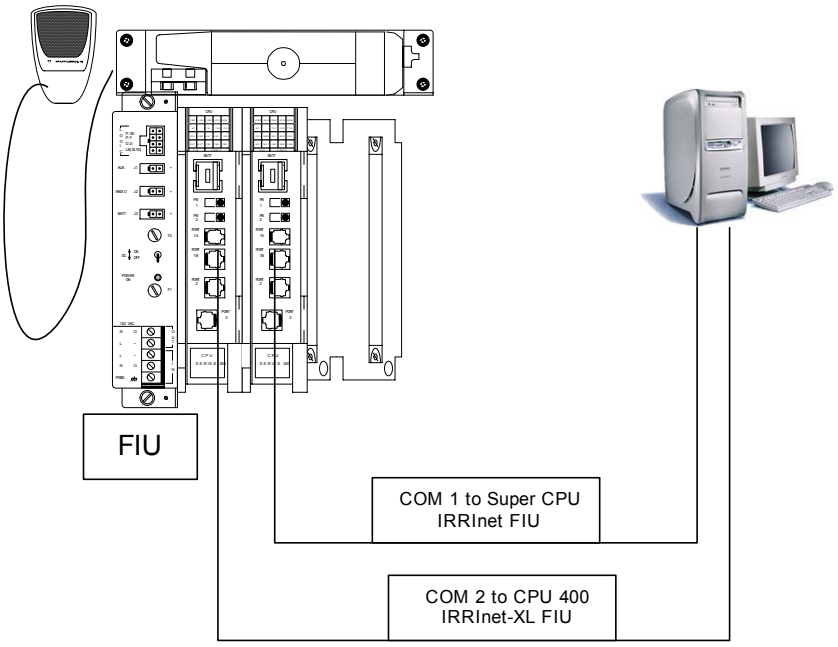
Click on the parameters tab.



FIU is a Field Unit: When this option is checked it means that the FIU may have I/O Modules itself or have a second radio to communicate with Scorpios. In other words This FIU is also an RTU.

Address: and PC Port: Type in the address of the IRRInet FIU in this field and choose the COM port, often COM 1, which the PC uses to communicate to IRRInet CPU (SUPER CPU).

Radio 1 and Radio 2: Radio communication settings for FIU, you may choose one radio to



Communicate with the RTUs in the field (and if the FIU is also a field unit) and the second radio to communicate with Scorpios, belonging to this FIU. Ask your reseller to provide you with C.M override time. From the Media choose radio, trunk or smart trunk and set Channel Monitor accordingly. If this FIU is also an RTU you may select Radio2 to communicate with Scorpios.

Line: Choose line communication if the FIU and RTU are communicating through a wire line. There are cases which line is chosen from the piggyback board, in the CPU, if so then the wire is using the radio port, and the "Line through Radio" must be checked. Next; choose if the FIU has high or low impedance, remember if the FIU is set at low impedance all RTUs must be at high Impedance. This rule is set to comply with only one low impedance unit per system. Lastly; Line level, is the audio level on the line, this option is usually is kept at zero.

Field Unit Communication Parameters: There are 4 permeates within this option.

Maximum Retries: set the number of retries the FIU should make to communicate with an RTU. After the FIU has exhausted these retries ICC will post "Communication Failure with Field Unit X"

Maximum Time Between Retries: Set the length of time FIU should wait before retrying to communicate with an RTU after a failed attempt. It is important to note the type of radio system you have and how busy it could be at certain times. This number should be set according this evaluation.

When in Comm. Fail: This option allows the operator to choose how long to wait before starting the next set of retries, when there is a communication failure with an RTU.

Minimum between Transmissions: It is possible to store messages in local ICC computer. Sometimes either due to the radio system or other reasons, the operator may need to set a delay between each radio transmission to a certain RTU. When time is set here, the messages are stored and send after the time is reached.

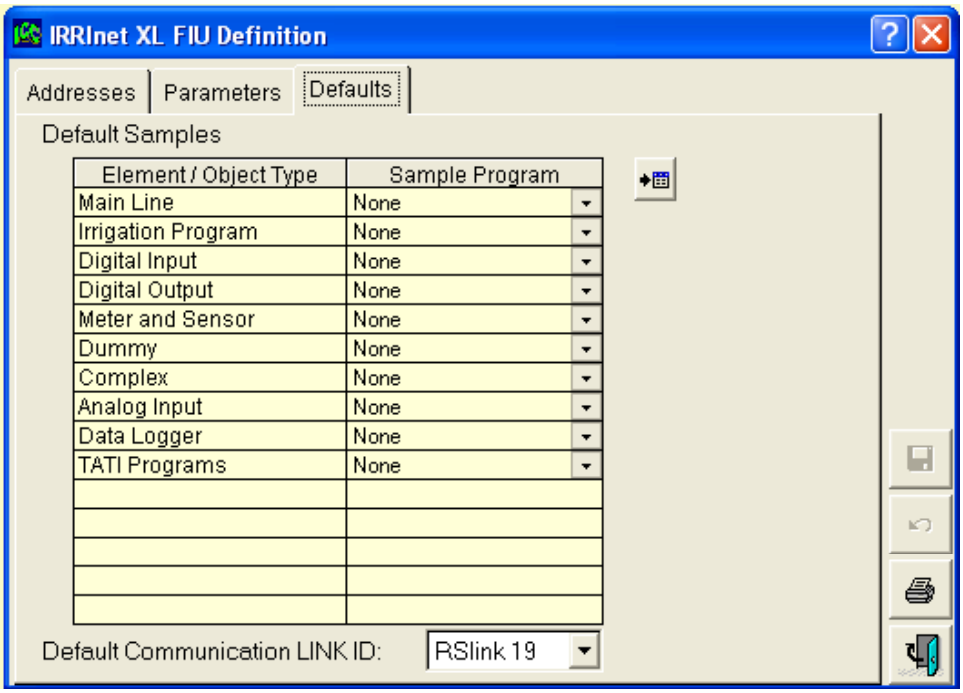
Defaults

Before we go on with this section, let us review a couple points.

ICC is a live system!!! Meaning you don't have to sample the RTUs in order to know what is going on in the field. Each RTU will report any and all event to the center. Sampling is an update of non-critical information from the RTUs.

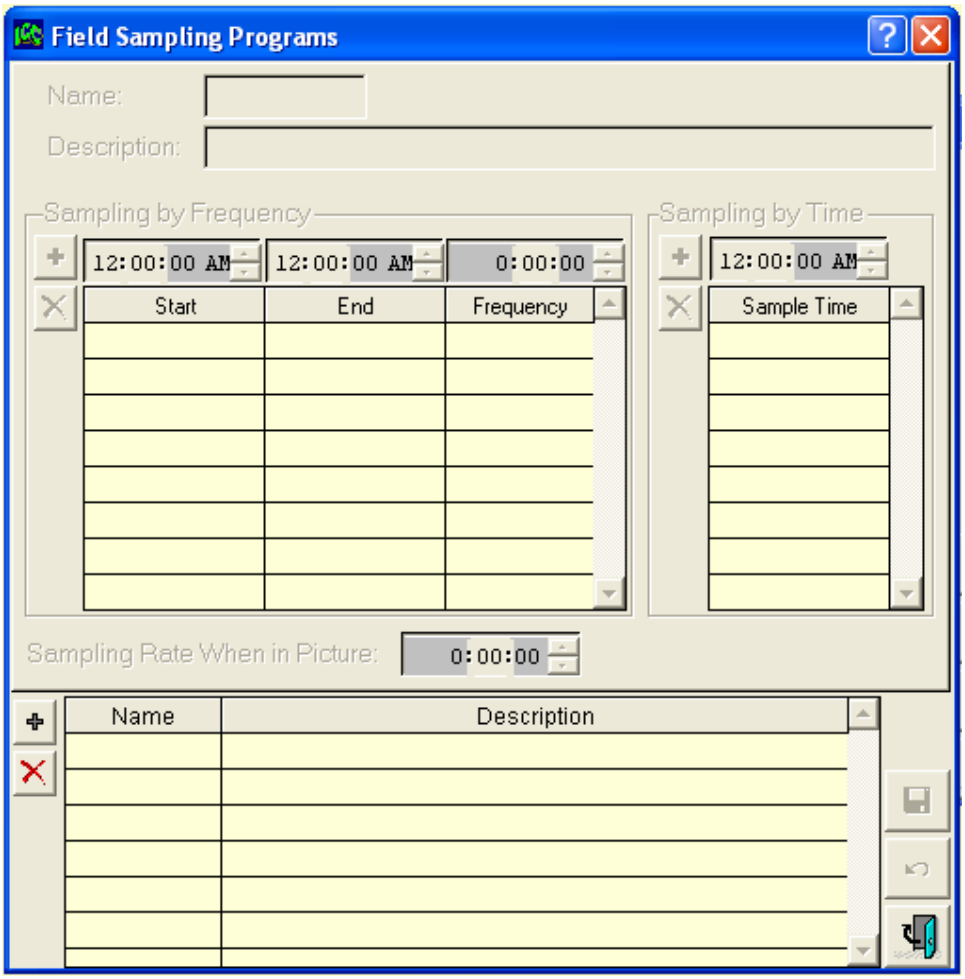
By creating "too many" sample times you may slow down your system by causing too much and some times unnecessary communication with your RTUs.

Note: There are more elements to be sampled for XL/XM RTUs than there are for IRRInet units.

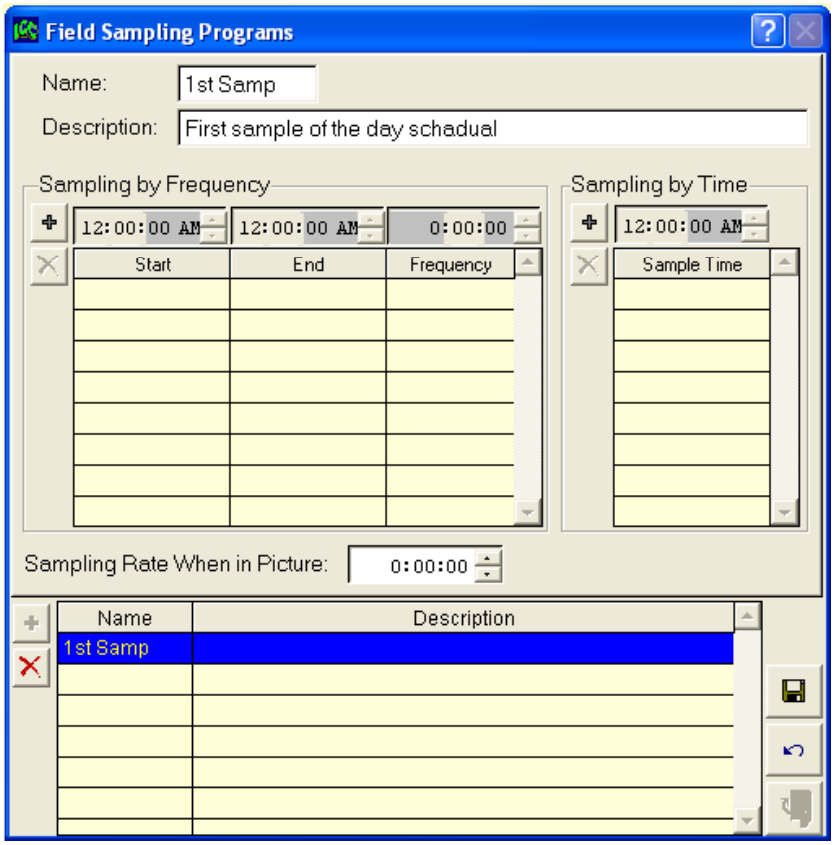


To start click on the table icon on the upper right hand of this screen.

Reminder: Whenever you see a table icon by a table, it means you may click and add new items to that table.



The new window "Field Sampling Programs" has three sections. Before you can add your sampling time and frequencies you have to create a new sample program. Click on the + sign by the lower table and type in a new name for this program.

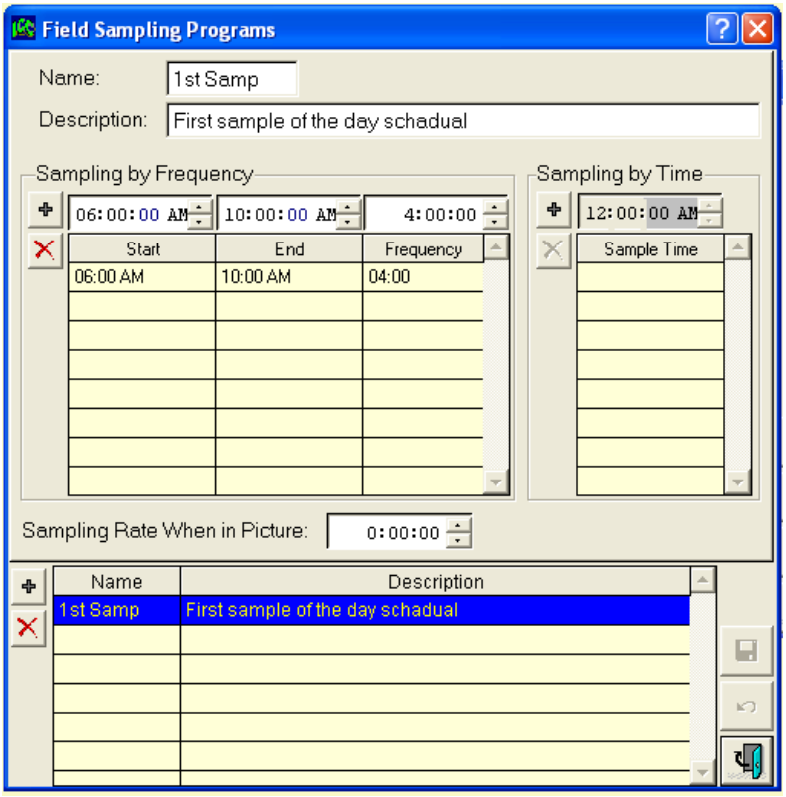


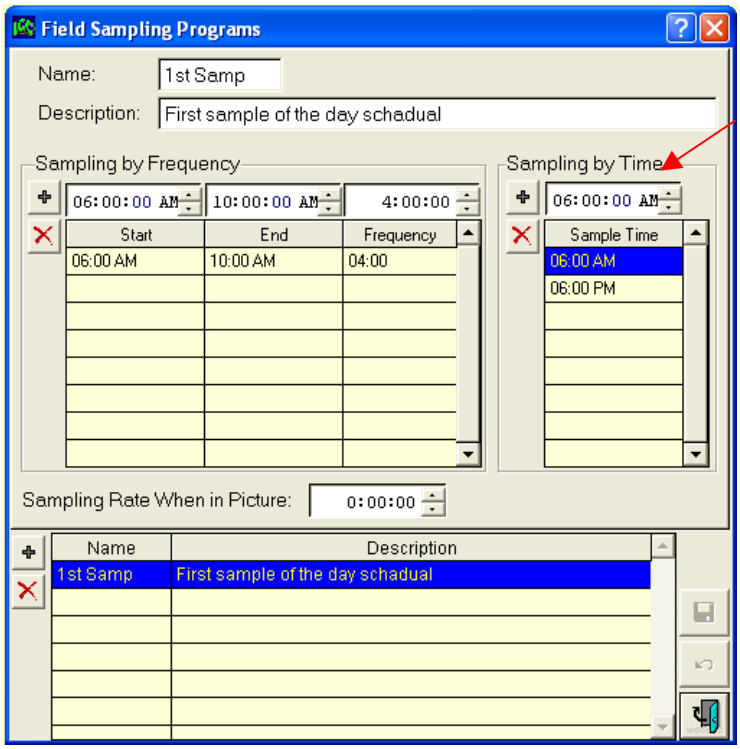
After typing a new name for this sample program you may also type in a description. Also note the two tables on top of this screen.

The table on the top left may be used to create sample times by frequency. To create such a program click on the plus sign and type in a start time and an end time. In the frequency type in "how often you would like to sample within the time period you just defined".

For example:

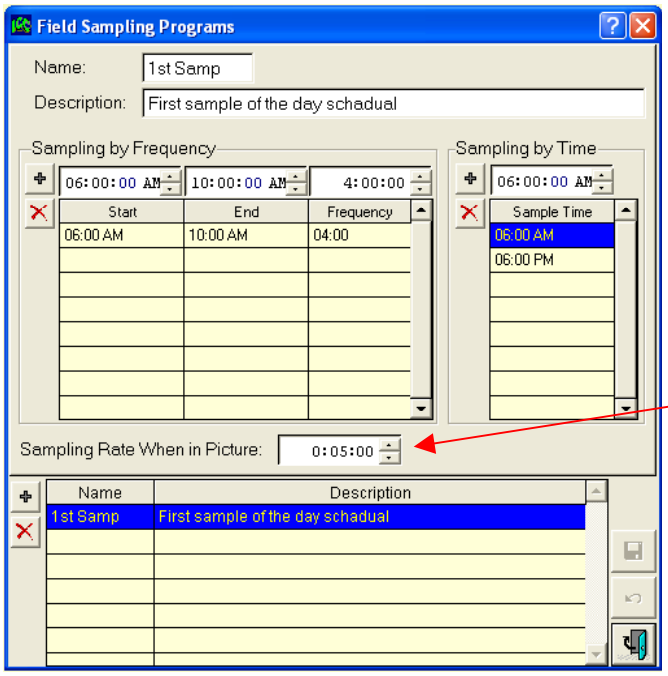
If you choose to have a start time of 6:00 A.M and an end time of 10:00 A.M with frequency of every 2 hours, then you will sample twice within the 4 hour time period of 6 to 10 A.M. To sample once you may choose my frequency to be every 4 hours.





Another method you may use to create a sampling time is to use sample by time of the day rather than by frequency. As per last sample if you would like to sample once a day at 6:00 A.M you may simply click on the + sign of the "Sampling by Time" and type in the time of the day you would like to sample.

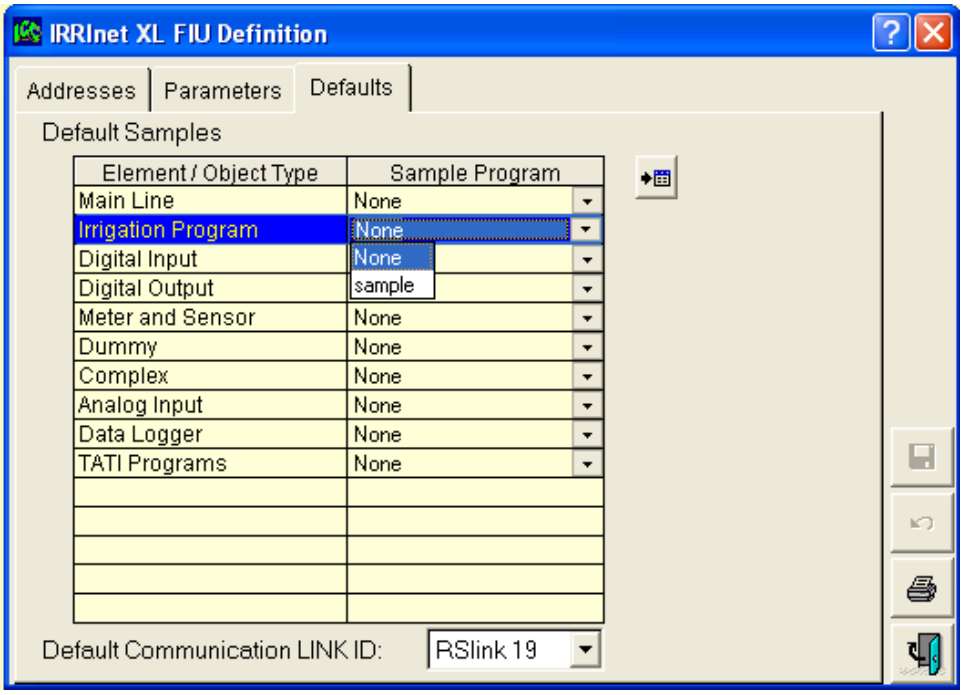
Lastly you may choose how often to sample when you are in picture! When in Fixed Screen of ICC any element which is attached to with this sample rate will be sampled.



Lets assume we have set this time to every 5 minutes.

When in the "Fixed Screen" of ICC the outputs, which have this sample program, will sample every 5 minutes when in picture, which is why it is good practice to be in the system view rather than field unit view when walking away from ICC computer.

Click Save to save this sample program and return to the last window.



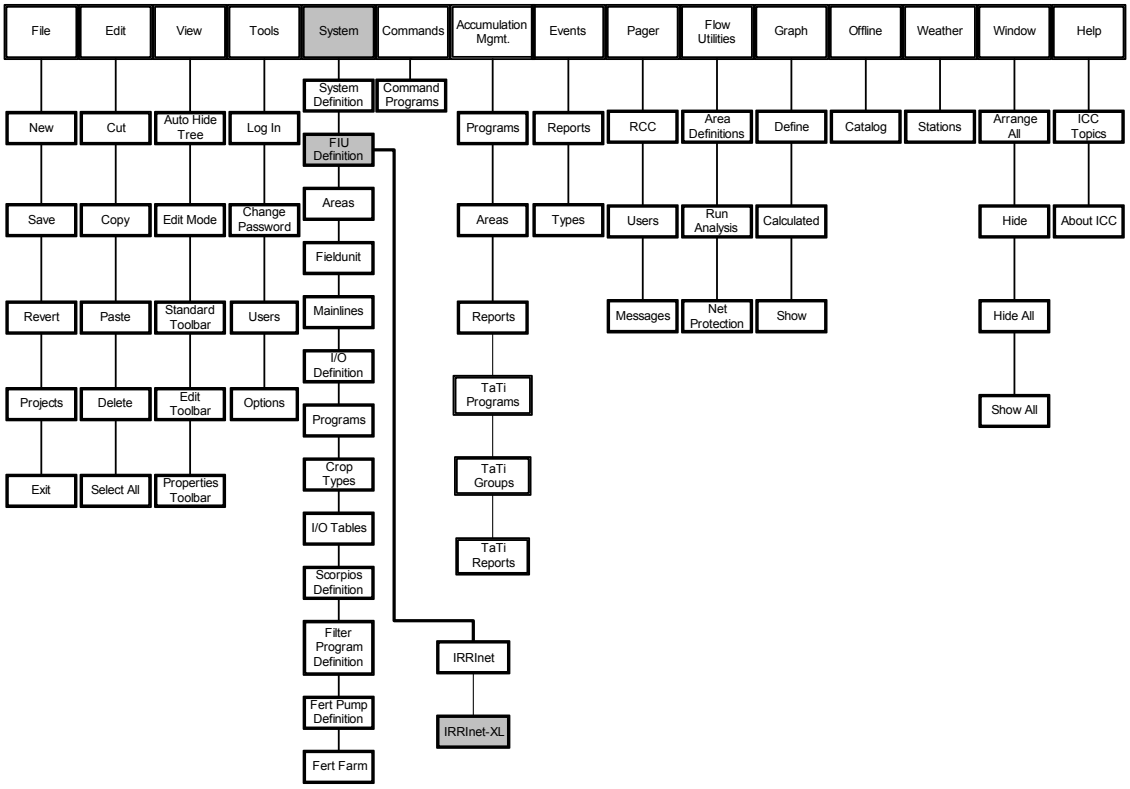
You may now choose which of the elements or objects within ICC should use the sample program you have just created by simple left clicking on the sample program.

Once done click save to continue.

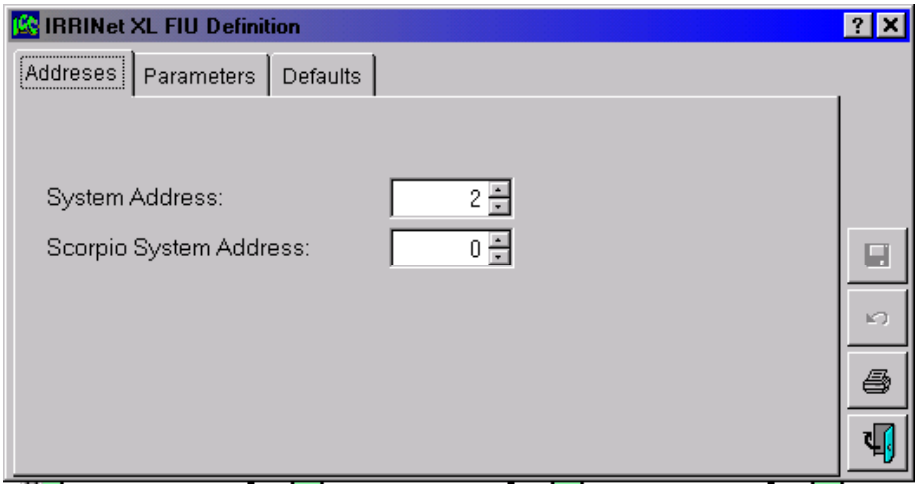
XL/XM FIU Definition:

As we explained earlier as per our diagram both an IRRInet FIU and an IRRInet-XL FIU need to be placed on the Motherboard at the center in order to communicate with both type of RTUs.

IRRInet Control Center… 13.X



IRRInet-XL FIU Definition



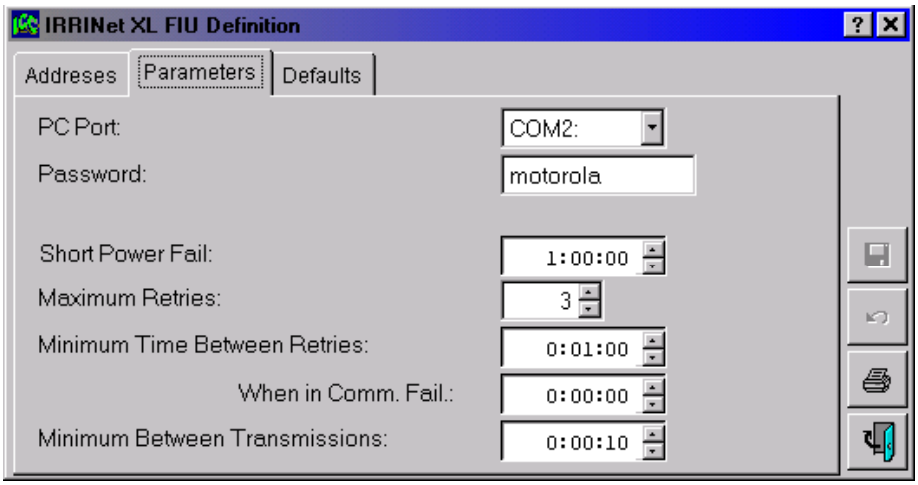
There are 3 tabs in this window, first tab is Addresses.

Addresses:

System Address: choose a numeric address that would fall with in the range of Field Unit Address Range. Any other field unit may not use this address. It is also important to note you may not use the same address as the IRRInet FIU. The system address must also be greater than zero.

Scorpio System Address: Type in the system address for Scorpio's associated with this system. The address can be between 0-8000.

Parameters:



PC Port: From the drop down menu choose the COM port, which this computer uses to communicate with the IRRInet-XL FIU (CPU420). Commonly we would choose COM2, since COM1 is used by the IRRInet FIU (SUPER CPU). However, if there are not any IRRInets in the field and this system only communicates with IRRInet-XLs, choose COM 1.

Password: IRRInet-XL communicates on a higher security level, and each datagram carries the system password, this is the same password as used with ToolBox to program this CPU. The password is case sensitive and is different than the password used to login to ICC.

Short Power Fail: This setting will allow for the irrigation time to make up for time lost during a power fail. After power recovery from a power lost, the RTU will try to irrigate and catch up with the programs it has fallen behind on. If the power failure exceeds the time set here, the RTU will not irrigate and wait for manual reset.

Maximum Retries: The number of times the FIU should retry establishing communication with an RTU before posting "Comm. Fail".

Minimum Time between Retries: length of time FIU should wait before retrying to communicate with an RTU after a failed communication attempt.

When in Comm. Fail: The FIU will try to re-communicate with an RTU after posting "Comm. Fail", if this time is set, FIU will wait the length of this time and retry to communicate with the RTU. If this time is set to zero, the comm. fail will remain till reset by an operator.

Minimum between Transmissions: The time between transmissions from FIU to each RTU Sometime when the FIU sends a message to an RTU it needs to wait a certain amount of time before sending more information to the same RTU. This could be due to data processing or simply the number of repeater a message may have to go through in order to reach it's destination. By setting Minimum between Transmissions, the operator will define the length of time ICC should wait before sending the next datagram. Note that a datagram could contain more than one message to an RTU.

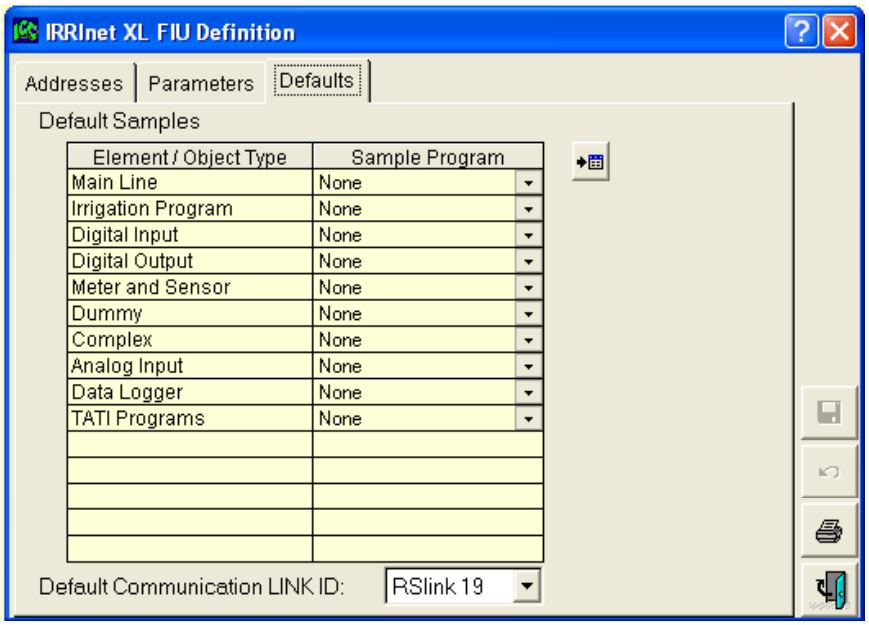
Defaults:

Before we go on with this section, let us review a couple points.

ICC is a live system!!! Meaning you don't have to sample the RTUs in order to know what is going on in the field. Each RTU will report any and all event to the center. Sampling is an update of non-critical information from the RTUs.

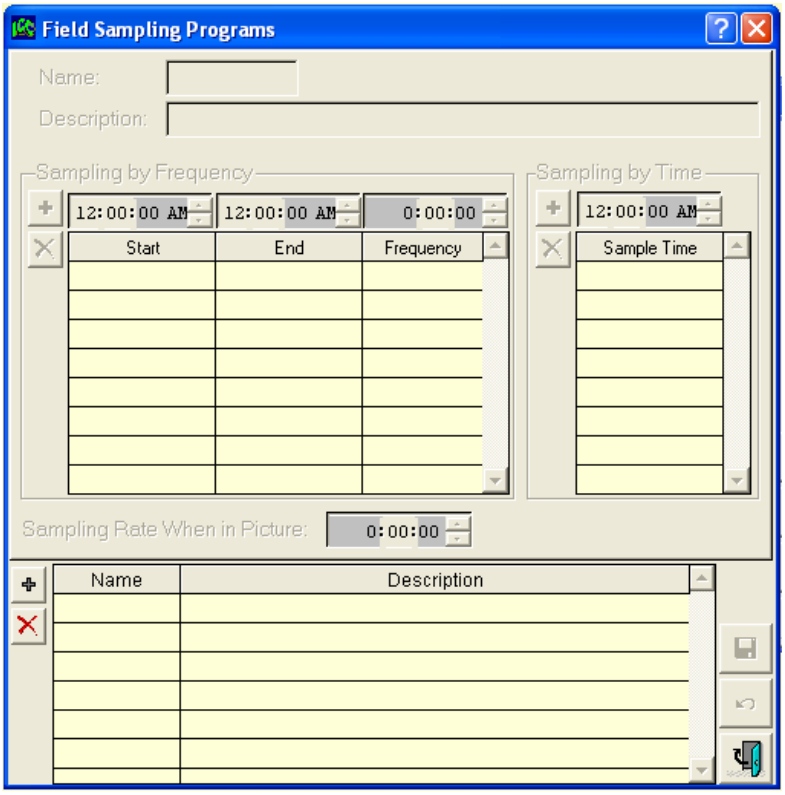
By creating "too many" sample times you may slow down your system by causing too much and some times unnecessary communication with your RTUs.

Note: There are more elements, which can be sampled for XL/XM RTUs than there are for IRRInet units.



To start click on the table icon on the upper right hand of this screen.

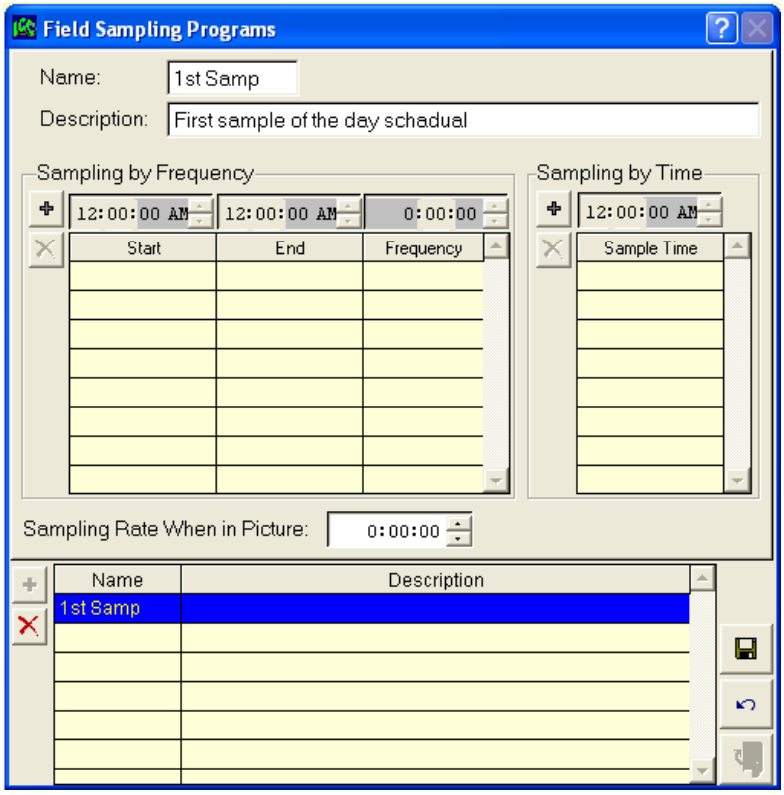
Reminder: Whenever you see a table icon by a table, it means you may click and



add new items to that table.

The new window "Field Sampling Programs" has three sections. Before you can add your sampling time and frequencies you have to create a new sample program. Click on the + sign by the lower table and type in a new name for this program.

After typing a new name for this sample program you may also type in a

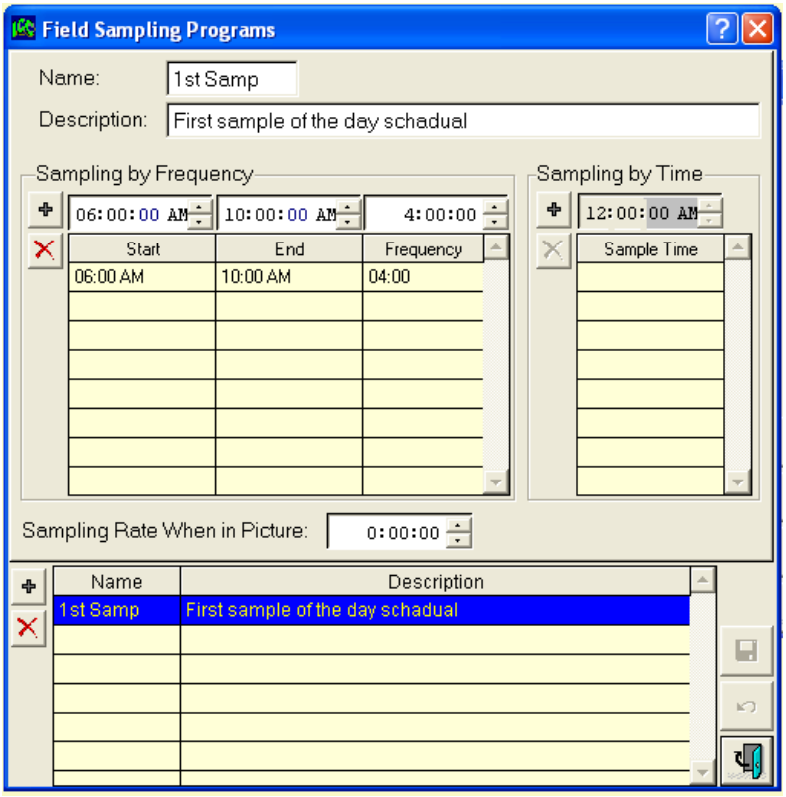


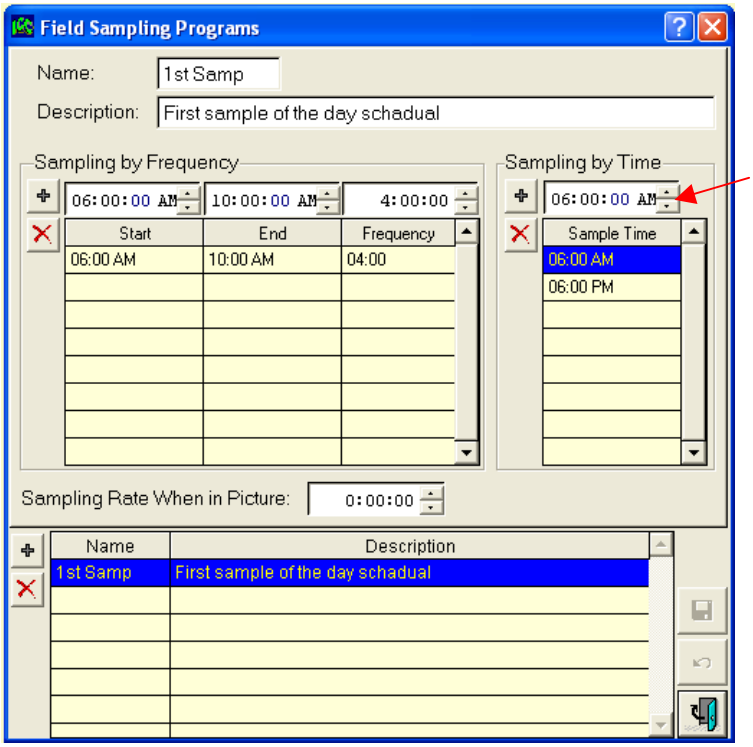
description. Also note the two tables on top of this screen.

The table on the top left may be used to create sample times by frequency. To create such a program click on the plus sign and type in a start time and an end time. In the frequency type in "how often you would like to sample within the time period you just defined".

For example:

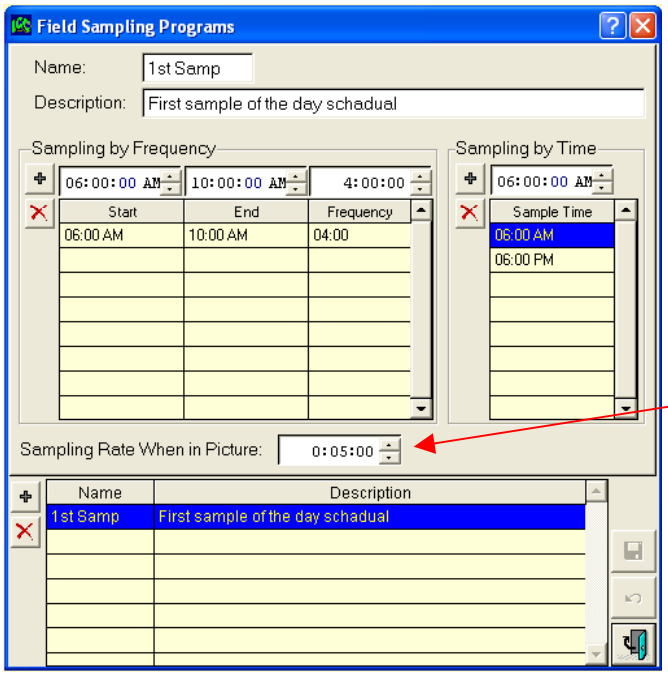
If you choose to have a start time of 6:00 A.M and an end time of 10:00 A.M with frequency of every 2 hours, then you will sample twice with in the 4 hour time period of 6 to 10 A.M. To sample once you may choose my frequency to be every 4 hours.





Another method you may use to create a sampling time is to use sample by time of the day rather than by frequency. As per last sample if you would like to sample once a day at 6:00 A.M you may simply click on the + sign of the "Sampling by Time" and type in the time of the day you would like to sample.

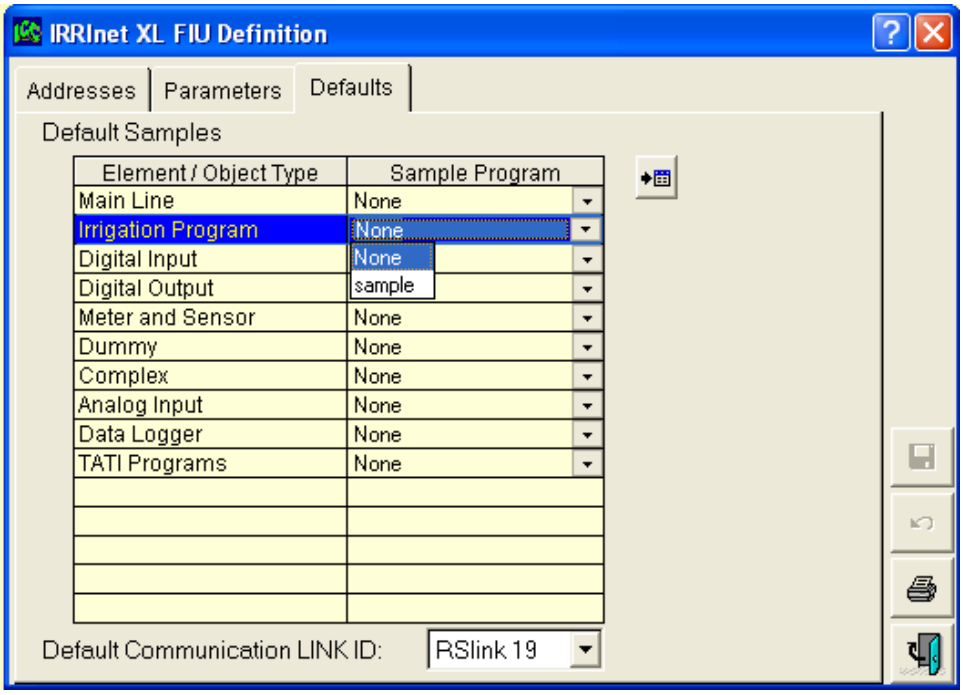
Lastly you may choose how often to sample when you are in picture! When in Fixed Screen of ICC any element which is attached to with this sample rate will be sampled.



Lets assume we have set this time to every 5 minutes.

When in the "Fixed Screen" of ICC the outputs, which have this sample program, will sample every 5 minutes when in picture, which is why it is good practice to be in the system view rather than field unit view when walking away from ICC computer.

Click Save to save this sample program and return to the last window.



You may now choose which of the elements or objects within ICC should use the sample program you have just created by simple left clicking on the sample program.

NOTE: Please note that if the user chooses to update often it would be a good practice to leave ICC in a system view, when walking away from the central computer. This practice will help during the instances where the radio is busy

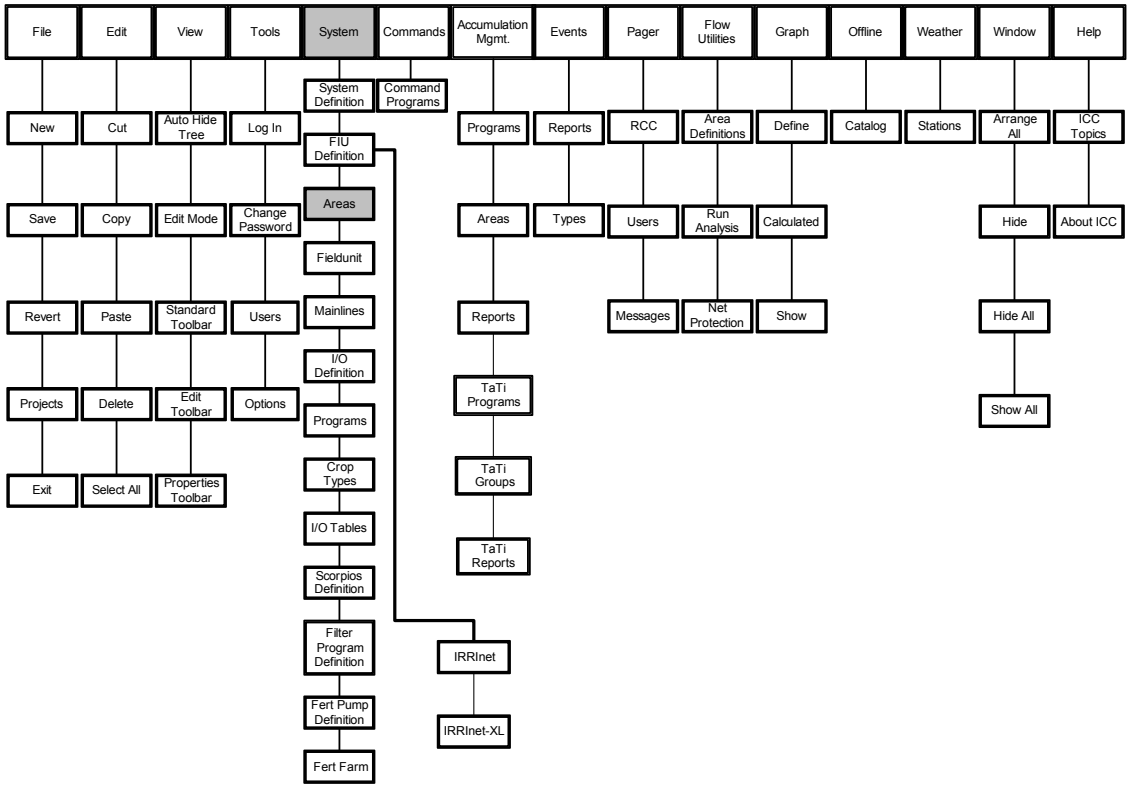
Default Communication LINK ID: The link ID for the FIU is almost always RSlink 19. This LINK ID must correspond with the LINK ID downloaded into the FIU at the time of programming with ToolBox. Please refer to the ToolBox manual for more details.

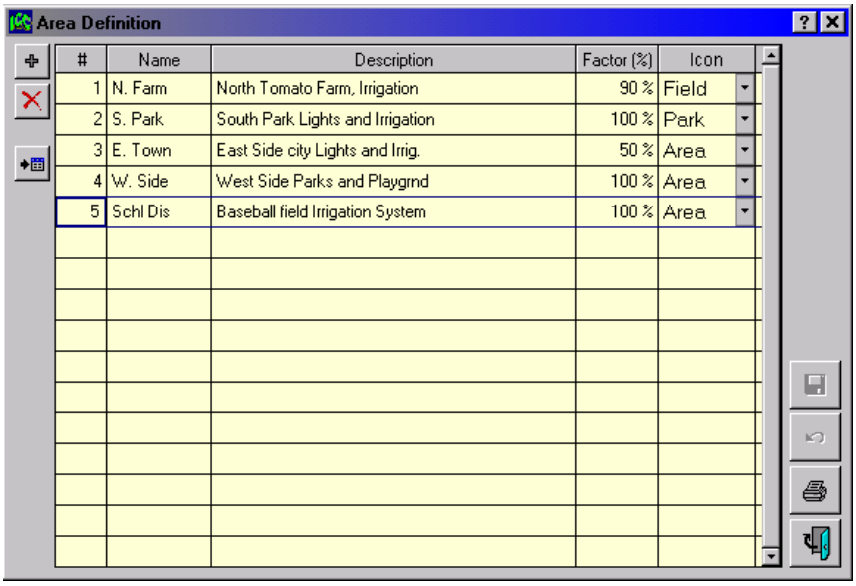
Area

From the main Menu choose System and click on Areas.

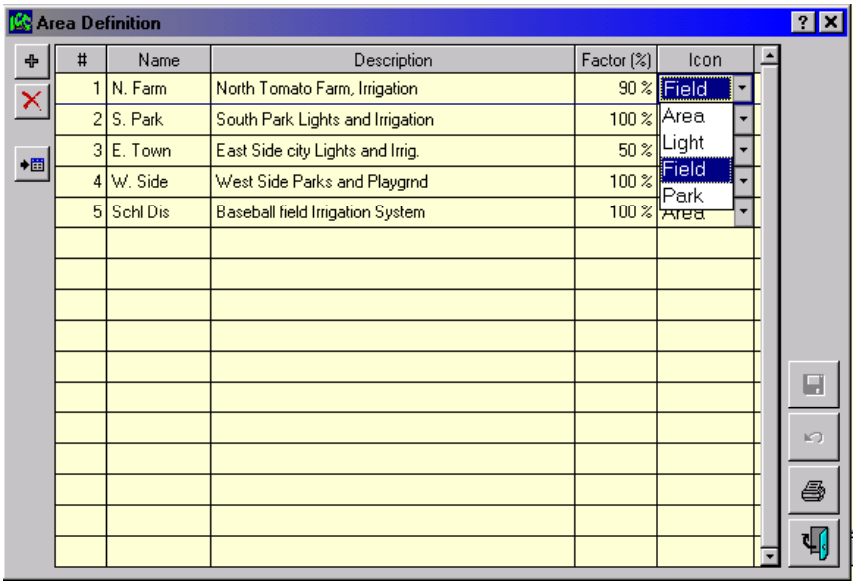
ICC Fixed and User screen are both tree structured to make it more convenient for operators to separate deferent areas as their system expands to cover larger territories. Areas simply allow the user to create subgroups to the System, where he/the operator may group RTUs within.

IRRInet Control Center… 13.X




Area Definition
Name Description Factor (%) Icon
1 N. Farm North Tomato Farm, Irrigation 90 % Field
2 S. Park South Park Lights and Irrigation 100 % Park
3 E. Town East Side city Lights and Irrig. 50 % Area
4 W. Side West Side Parks and Playgrnd 100 % Area
5 Schl Dis Baseball field Irrigation System 100 % Area

After opening the Area Definition window click on the "+" to add a new area. Simply type in the name of the area and description, and choose water factor if appropriate. Note before choosing a water factor, read the section in this manual on water factor and its effect on the system.

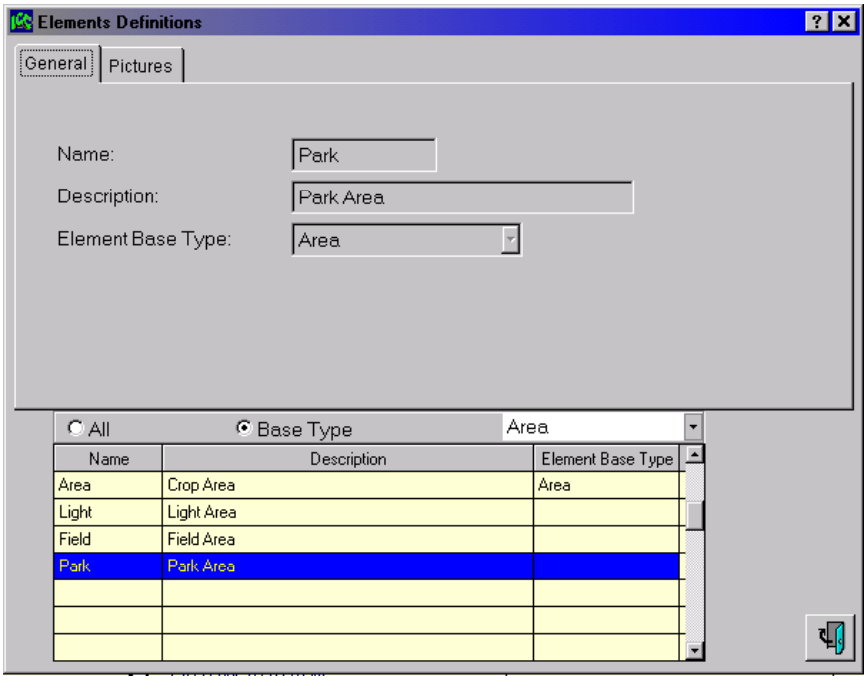

Area Definition
Name Description Factor (%) Icon
1 N. Farm North Tomato Farm, Irrigation 90 % Field
2 S. Park South Park Lights and Irrigation 100 % Area
3 E. Town East Side city Lights and Irrig. 50 % Light
4 W. Side West Side Parks and Playgrnd 100 % Field
5 Schl Dis Baseball field Irrigation System 100 % Park
Area

From the Icon drop down menu, choose one of the four icons. These are just icons and will not make a difference in the system. However choosing different icons make it visually easier to detect and switch between different areas.

The following is a demonstration of the 4 Areas we created and the representative icons.

Light **Park** **Field** **Area**

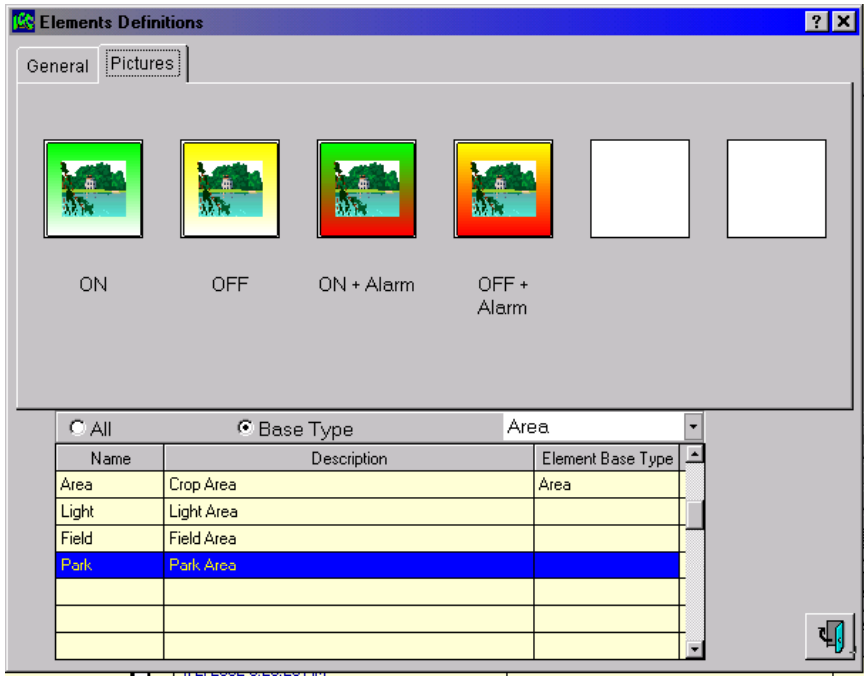
It is possible to review the available icons in ICC by clicking on the table button, which is located immediately under add and delete buttons. This option will open a new window called "Elements Definitions".



Elements Definitions:

General: The Elements window displays the list of possible "Area" icons currently available.

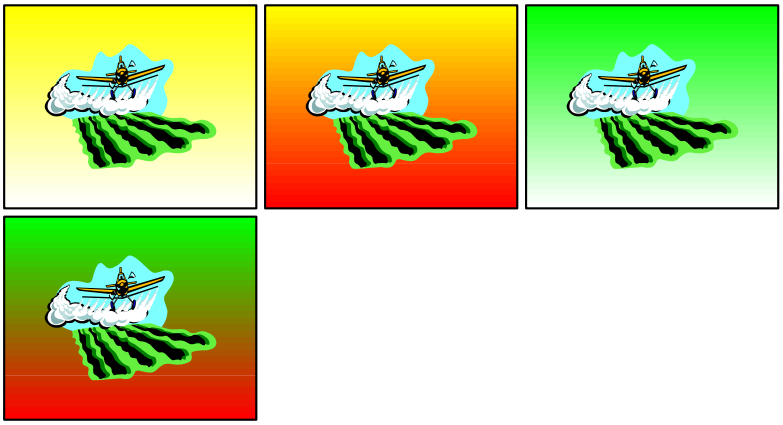
Pictures: To review the possible icons simply click on the name of the icon and click on the "Picture" tab. A list of the icons with description of each will appear. For example when an icon is yellow and red it represents the area off (no irrigation is running, program or manual operation) and in alarm.



ICC is build around the operator, and it allows each user to customize ICC to perfectly fit the application it's being used for. One of such is to allow the operator to create customize icons or use of the previously provided icons by Motorola.

Creating Icons:

As you may have notice in the "Pictures" tab of "Elements Definition" window, each icon has 4 different views. It is necessary to create these four different views to be able to view and notice status of the element. For example the icon for Crop Area would show…



Each icon will represent a different area condition:

Yellow: Area off all ok

Yellow / Red: Area off with an alarm

Green: Irrigating, either manually or by program

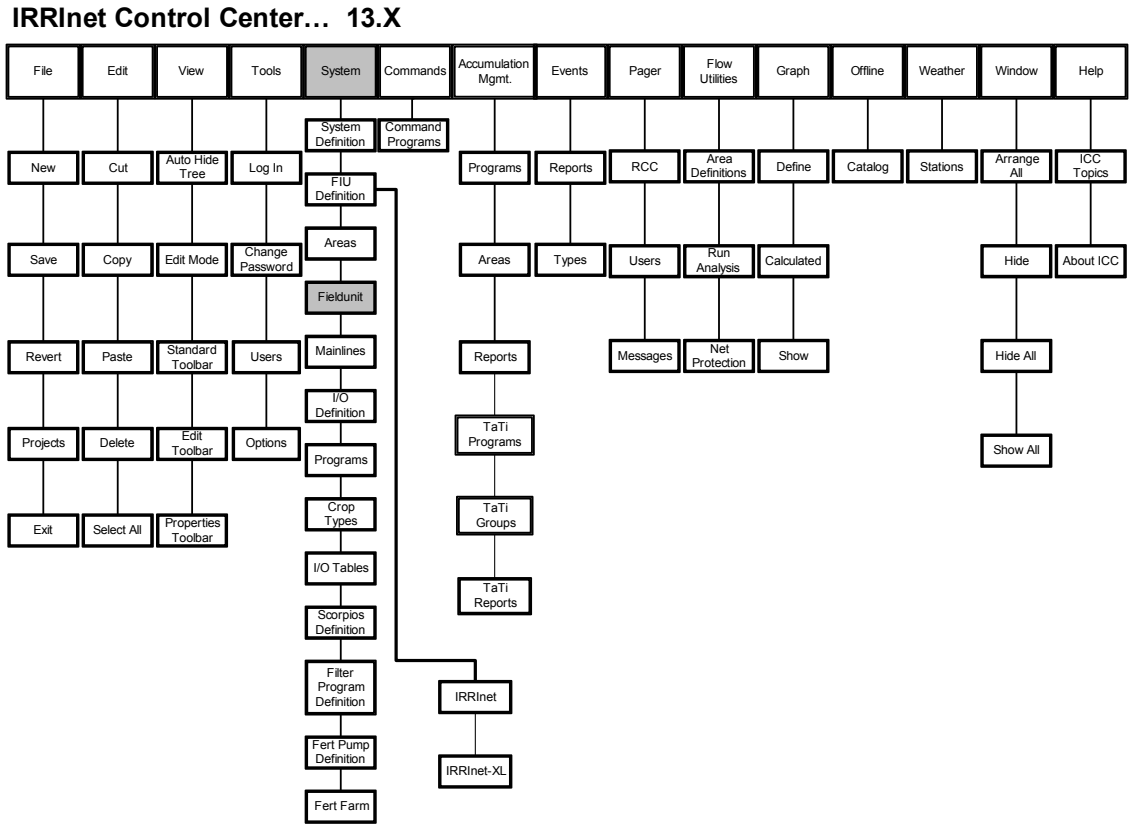
Green / Red: Irrigating and Alarm

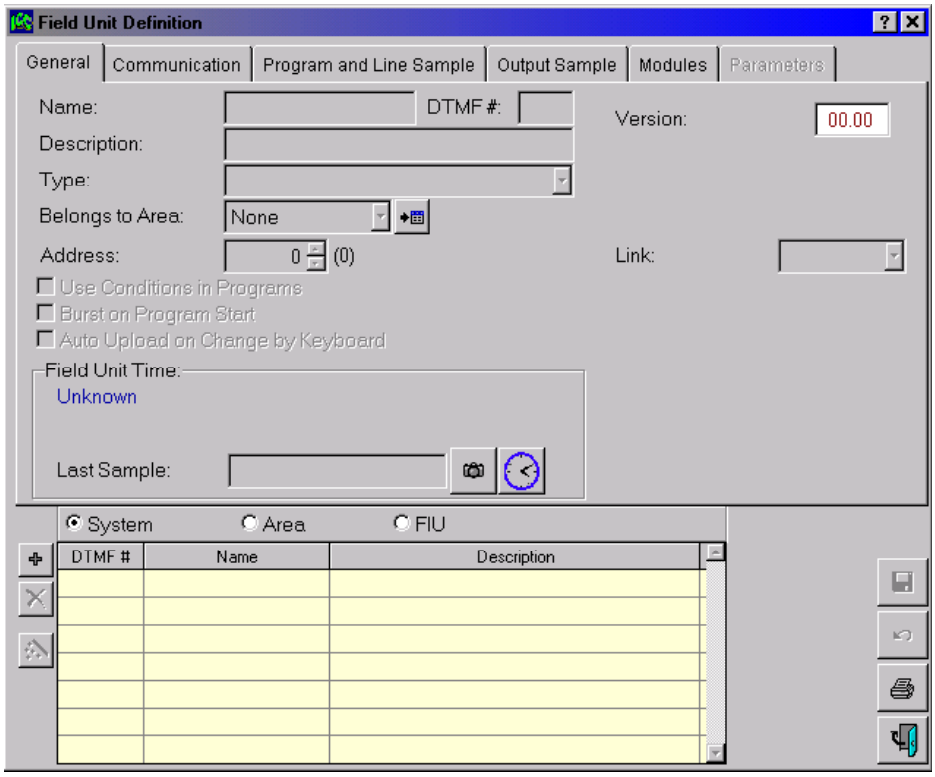
Using a draw application such as Paint Shop Pro [tm] create all 4 icons and save them in "Windows Enhanced Meta File (.emf)" format

Field Units:

The next step is to define the field units that comprise the system

From the main menu choose "System" and click on "Field Units".





We will review each tab in detail. As a reference here is a brief description of you should expect in each tab.

General: Add and remove field units. It's important to note that you may not delete a field unit if it is tide to other parts of ICC application such as "Commands".

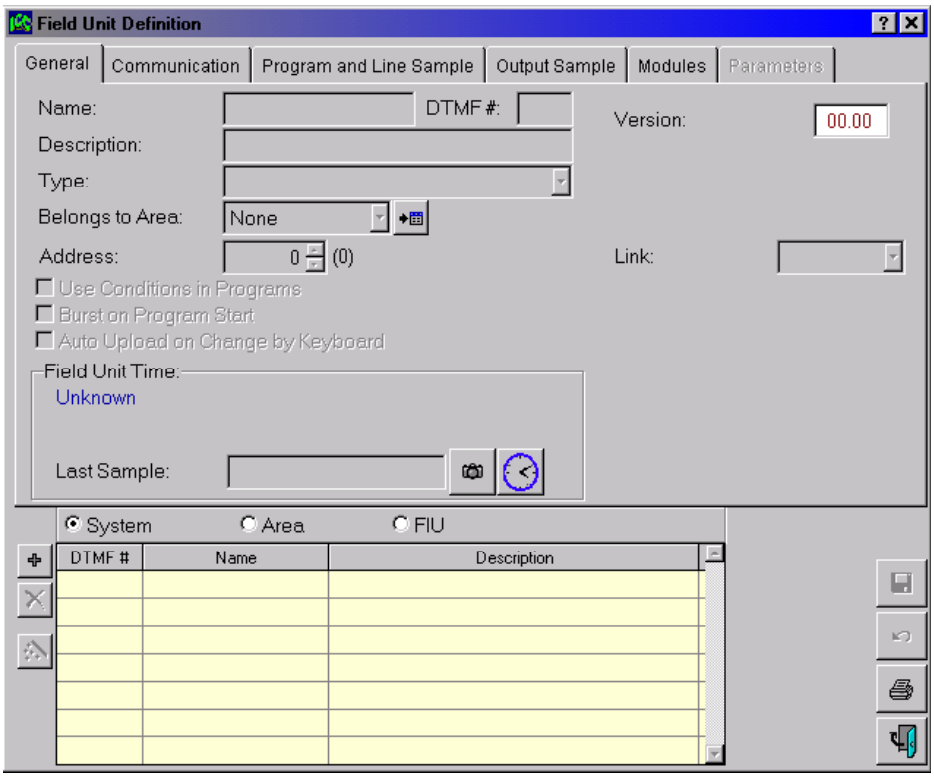
Communication: Settings for communication with Scorpio and IMPACTs can be found here.

Programs and line Sample: Choose how often ICC should sample the Programs and Lines belonging to this field unit.

Output sample: Choose how often ICC should sample the Outputs of this field unit.

Modules: After the address of this field unit is placed in the General Tab, you may either ask ICC to upload the modules from the field unit or choose them in this window from a designated list.

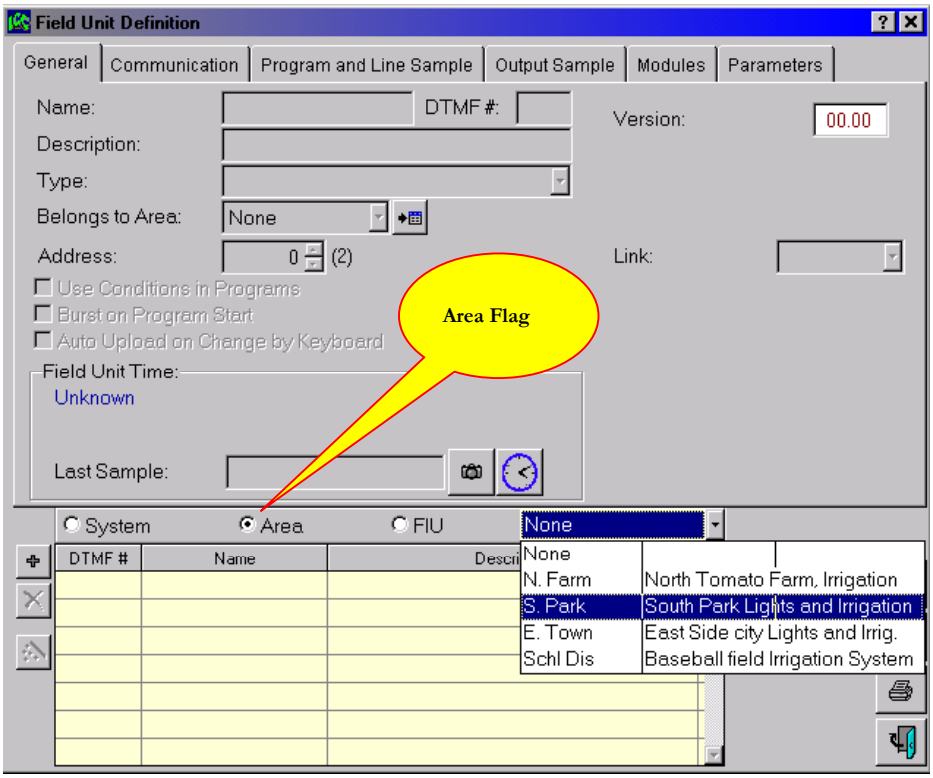
Parameters: These options are only available for IRRInet-XL and CPU420; they are grayed out if you choose any other type of field unit. The options in this window are for events and specific alarms based on the time you input.



Add New Field Units (We will review IRRInet-XL first)

Before clicking on " + " to add new field units choose which area to add the field unit to.

To do this check the flag for "***area***" by clicking the box next to "area", a drop down menu will appear. From the menu choose the area for this field unit.



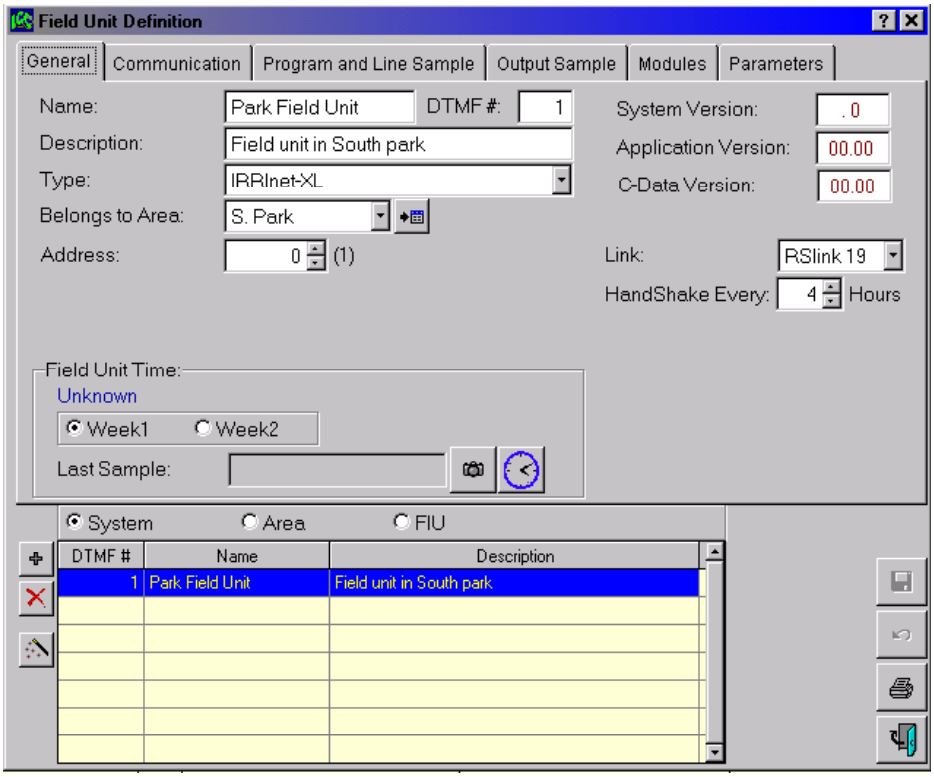
- Click on the "+" and all the fields will become apparent.

Name: Type in the name of the field unit.

Description: and any description pertains to it.

Type: From the type drop down menu choose the type of field unit. Here we will choose IRRInet-XL and after covering all the settings of this field unit we will revisit to cover all the other choices.

Belongs To Area: If you have changed your mind about which area this field



unit will belong too, from the "belongs to Area" choose the new area.

A new area can be added to the list of areas in this system by clicking on the table icon located next to the drop down menu. By clicking on this table the "Area Definitions" window will appear".

Address: Type in the address of this field unit, you will notice that address 0 is taken. This is due to the fact that earlier we assigned address 0 to IRRInet-XL FIU. Therefore address 0 for the field unit will actually be address 1 in the system.

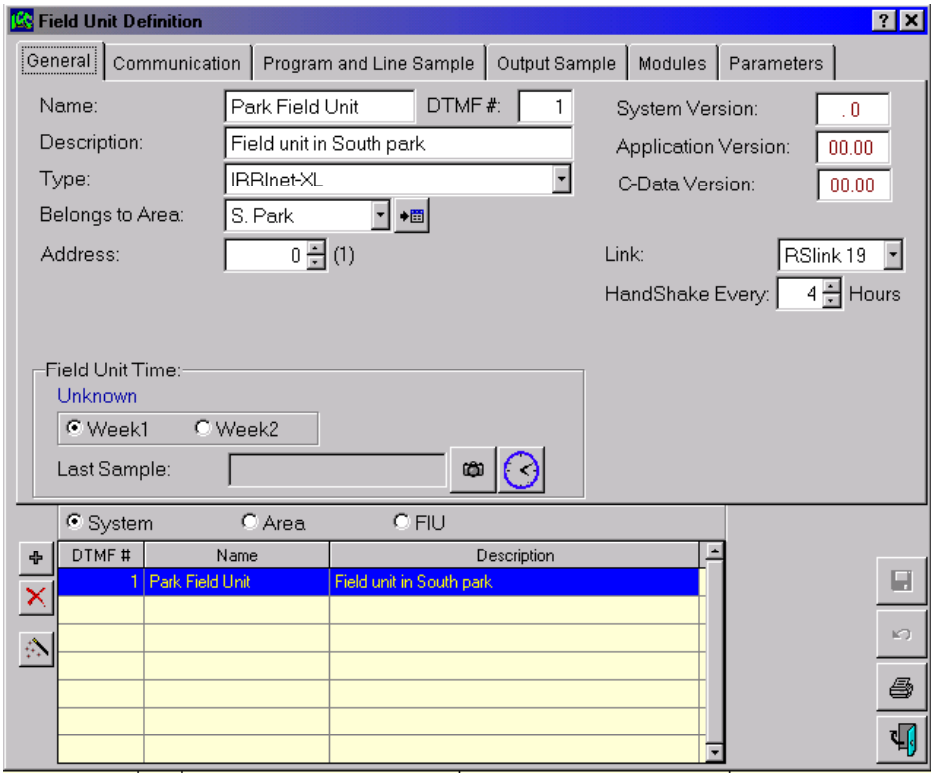
Field Unit Time: This time is automatically uploaded after the first communication with this Field unit.

Week1/Week2:_ As mentioned before you may program ICC per two week interval, by checking the week 1 or week 2 flag here the operator may choose which week of irrigation this field unit is starting at.

Last Sample: After the first communication is established with this field unit, the last sample time of this field unit will appear in the box immediately in front of the "Last Sample". The operator may sample the field unit by clicking on the camera.

Once communication is established with this field unit you may click on this button to sample the field unit.

Click on this button to synchronize the field unit time with the PC time.



System Version: After communication is established with the field unit, this field will display the "System Version". Your reseller would have downloaded flash software into the IRRInet-XL previously using the ToolBox software. If you cannot establish communication with the field unit, it may be caused of bad flash download. Contact your reseller for more info.

Application Version: After communication is established with the field unit, this field will display the "Application Version".

C-Data Version: After communication is established with the field unit, this field will display the "C-Data Version".

Link: There are 145 link options, in order to choose the right link. The operator must have a full understanding of system design. In this next section we will review communication link in ICC.

LINK (continued); Link Options for IRRInet-XL:

The system may support a network comprised of a nearly unlimited number of links. The RTU supports a variety of communication media and baud rates, as detailed below:

Through the radio/wireline communication port:

Direct FM (DFM) modem on conventional radio, up to 4800 bps

FSK modem on conventional radio, up to 2400 bps

FSK modem on trunked radio, up to 2400 bps

Wireline, up to 19200 bps, using external modems

Wireline, up to 2400 bps, using built-in modems

Dial-up, up to 2400 bps, using built-in modems

External Dial-up modem

. Through the RS-232-C and RS-485 communication ports, up to 19200 bps.

The communication via the various ports may be simultaneous.

The RTU operates on all radio frequencies: VHF 136-174 MHz, UHF 403-430 and 450-470 MHz, Logic Condition MHz band, 800/Logic Condition MHz trunking and microwave.

The RTU contains a circuit for monitoring activity on the radio or line communications channel. Channel access software prevents the RTU from transmitting over a busy channel. Transmission is inhibited until the channel is free. There are also several priority levels for getting to the channel when it becomes available.

Communication Types:

The RTUs in the system are linked to a radio or wireline network as defined by the system operator, according to user requirements. Each RTU executes its application and, *simultaneously*, supports the communications link (or links) defined for it, and serves as a network node, if so defined.

The IRRInet-XL/CPU420 system supports up to 29 wireline links (LINE 1 to LINE 29), up to nine radio links (RADIO 1 to RADIO 9), and up to 19 local RTU-to-RTU links (RS-link 1 to RS-link 19) that use RS232. Any of the radios may be either conventional or trunked. Computers may be connected to the ports configured as RS232 Local Computer or as local RTU-to-RTU link.

For conventional radios, up to nine zones can be defined on every frequency (of the nine supported frequencies). A radio link for conventional radios is divided into zones when not all sites can communicate with each other and F1/F2 repeaters (using two frequencies) are not to be used. In this case, some RTUs will serve as Store & Forward repeaters and the link is divided into zones.

A zone is defined as a group of one or more sites that can directly communicate with each other without a Store & Forward repeater. The name of a zone is composed of the link name and the zone number. For example, for RADIO 3 zone number 1 is named RADIO 3/1, zone number 2 - RADIO 3/2 and so on.

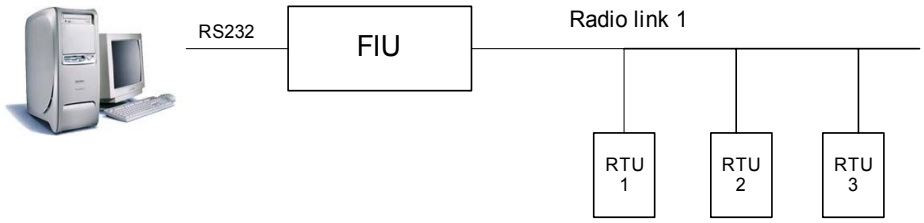
After defining the communications network, the user must define the various links used in the system as well as the RTUs that serve as nodes between the links. A network node is an RTU that functions as an interconnection point between two or more different links. A Store & Forward node, on the other hand, is a network node, which relays messages using the same physical port.

Network Configurations:

The MOSCAD system supports both simple and complex communication networks. The following sections describe various configurations from different aspects.

Simple System:

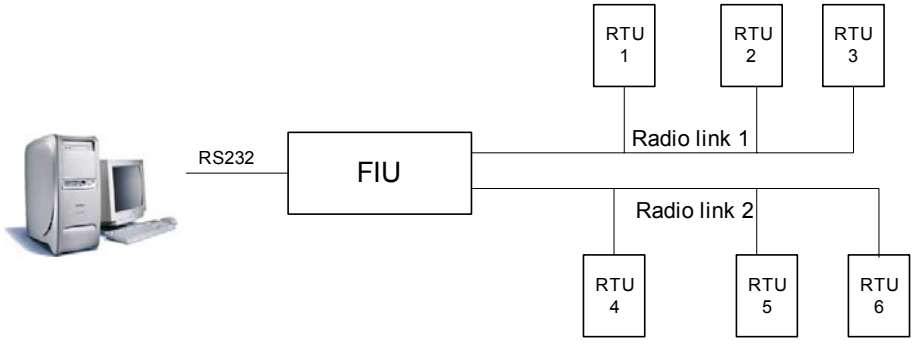
A simple system, comprised of a central computer and RTUs connected over *one communication lin*k, is shown in the following figure:



The radio link, named RADIO link 1 in the above figure, can be a conventional radio using DFM (Direct Frequency Modulation) or FSK (Frequency Shift Keying) radio modems, or a trunked radio using FSK radio modem.

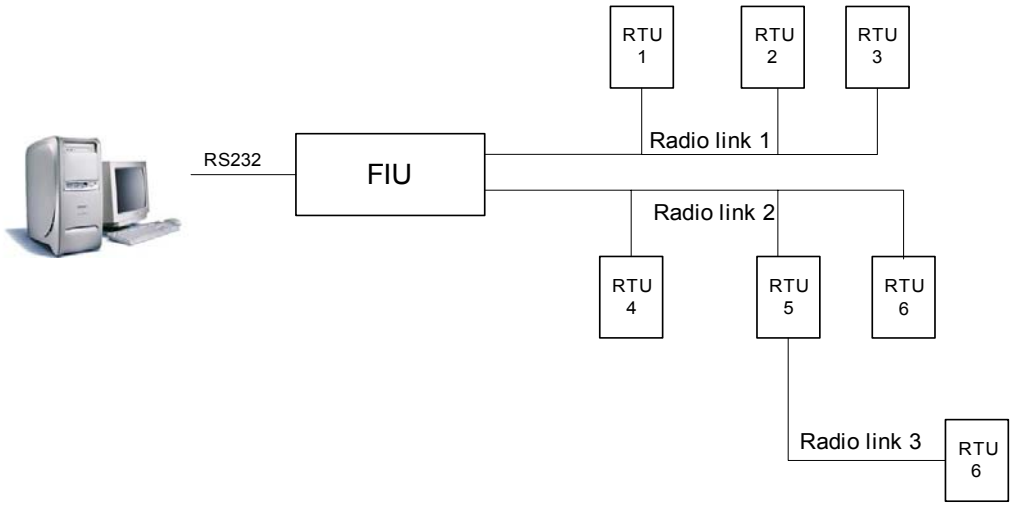
Two-Link and Multiple Link Systems:

A two-link system utilizing a communications network, comprised of two communication links, is described in the following figure:



A multi-link system is a network that uses several link types. The following figure illustrates a system where a third link type, RADIO 3, connects an RTU to

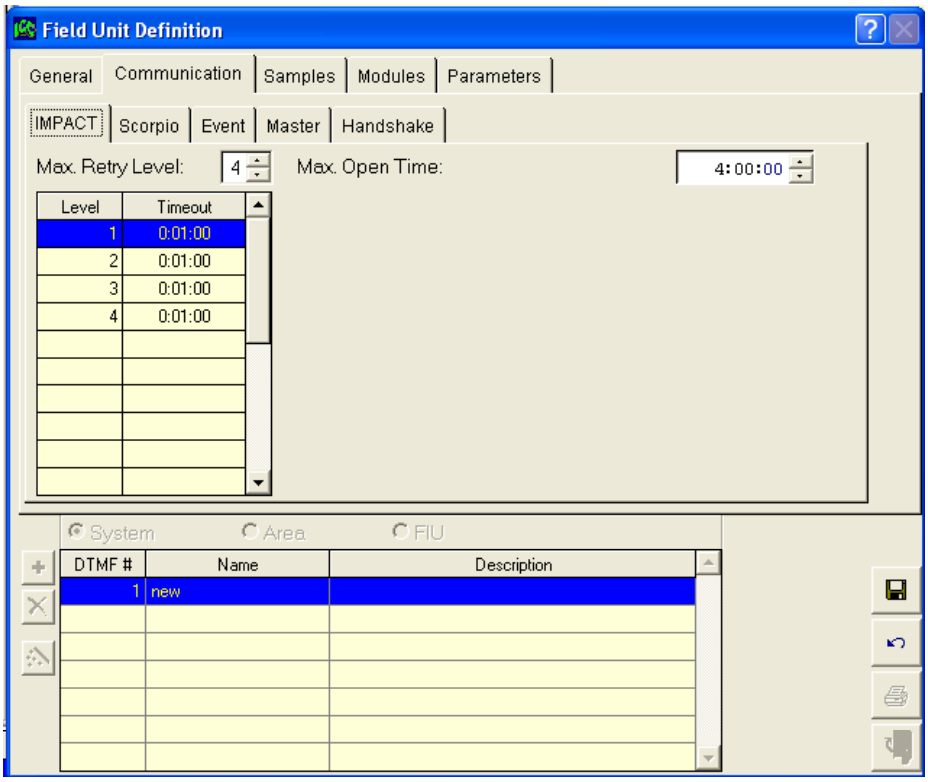
another terminal that communicates over RADIO 2. RTUs connected to the RADIO 1 link can reach RTU 7 via RADIO 2.



Hand Shake Every: Choose how often this field unit should hand shake with the FIU. A handshake comprises of a small transmission of data to the field unit and an acknowledge back. Handshake is usually done to check on the health of a field unit. This time should be set with respect to normal communication with this field unit.

Communication Tab:

There are 3 tabs within this tab, IMPACT, SCORPIO, and EVENT.



IMPACT: (Note: this option is different if you are using an IRRInet, we will cover IRRInet in the next section)

IMPACTs remote units built for one-way communication only. Each is equipped with a Motorola Bravo ™ pager, with a pre-programmed address from the factory.

Since there is no acknowledgment from an IMPACT on whether the request for open/close was received ICC has some built in protection.

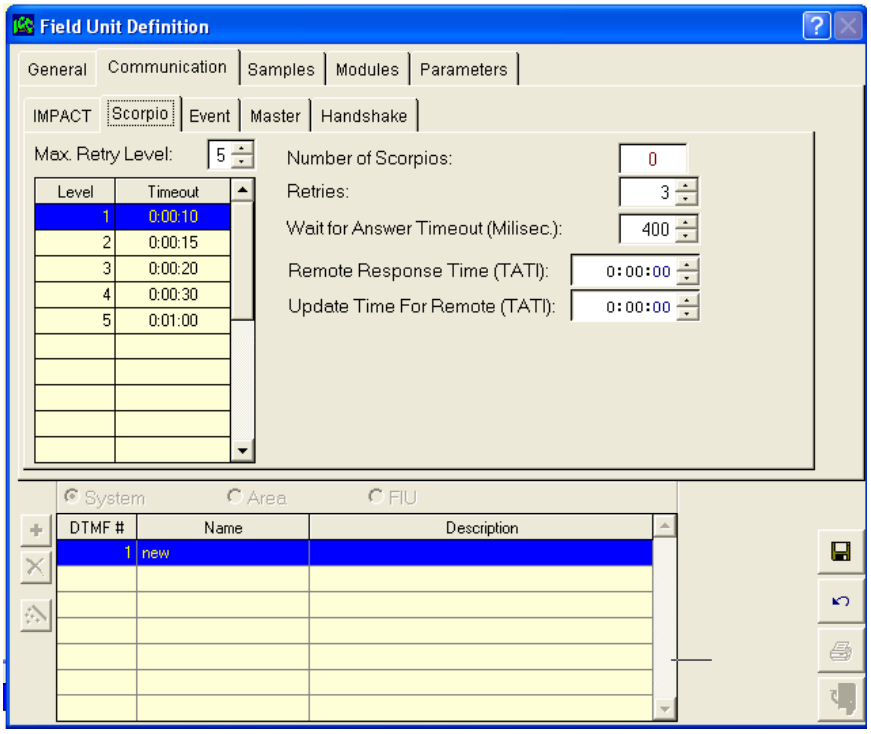
Max. Retry Level: To make certain each IMPACT has received it's message from the corresponding Field Unit, an operator may program the field unit to repeat the message. Type in the number of times this field unit should send each message to its IMPACTs. The number of levels will change to match with this number. You may then type in the time between each retry in the corresponding field in the table.

Time Out: Here the operator may type in the length of time between each retry. You may choose your second retry to be after a longer wait than the first one and so on. The default time is at 1 minute.

Max. Open Time: It is possible that an IMPACT with low battery, may not receive "close" transmission for the central no matter how many retries are sent by ICC. Max Open Time, the time sent out with each transmission for open. If this time is set for 4 hrs for example, the IMPACT will close the valve, at 4 hrs, even though it has not received the close message from the central.

Scorpio Tab:

(**Note**: this option is different if you are using an IRRInet, we will cover



IRRInet in the next section)

Max retry level: To make certain each Scorpio receives a message from its corresponding Field Unit, the operator can program the field unit to repeat the message. Type in the number of times this field unit should send each message to its Scorpios. The number of levels will change to match with this number. You may then type in the time between each retry in the corresponding field in the table.

Number of Scorpios: This fixed number will show the number of Scorpio's attached to this RTU.

Retries: Type in the number of retries, for all levels of communication with the Scorpios attached to this RTU. It is important to note, all communication with these Scorpios will be repeated.

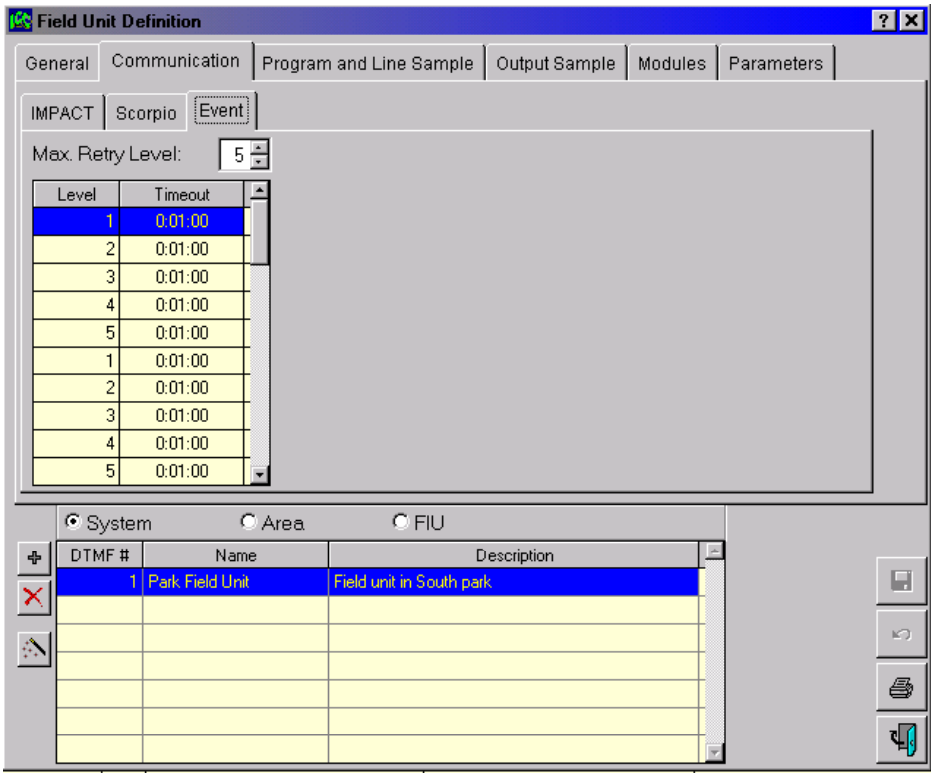
Wait for Answer Timeout (Millisec.): Before retrying to resend a message, this is the length of the time the RTU should wait before resending a message to a Scorpio.

Remote Response Time (TATI): Define the length of time between each handshake for Tariff Time (TATI) between the RTU and the remote.

Update Time For Remote (TATI): Define how often should the RTU get TATI data from its remotes.

Note TATI is explained in the TATI section of this manual.

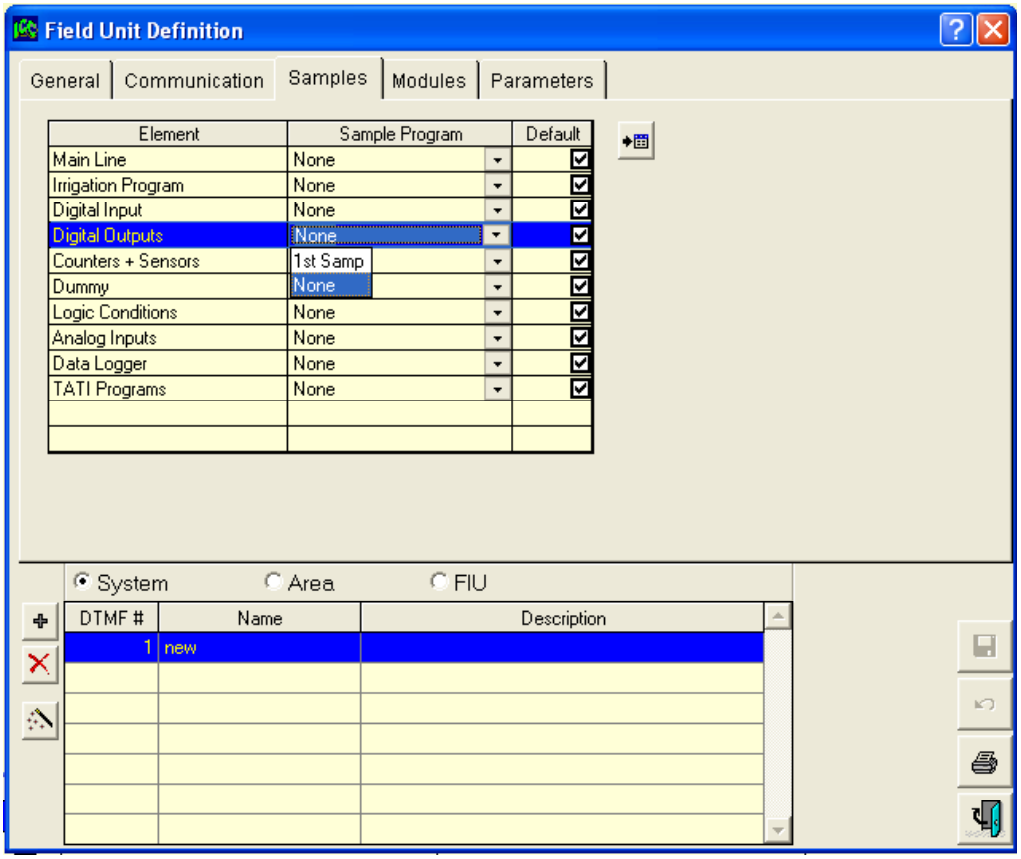
Event Tab:



IRRInet XL has Max retry level option for Events, you may define how often should the RTU retry sending it's events and how often should it try.

Samples Tab:

Earlier in the "Default" tab IRRInet and IRRInet-XL FIU tabs we defined the "Default sample rates" for all RTUs on this system. However; it is possible to choose how often to sample the program and lines on each RTU individually.

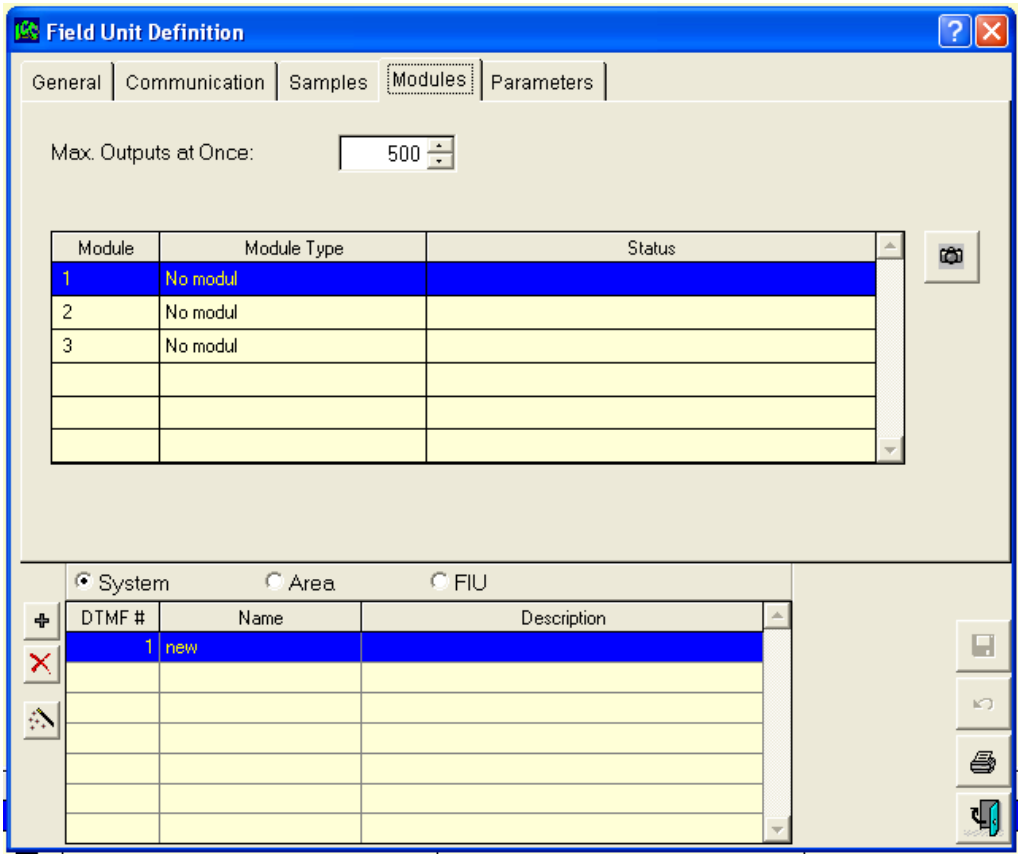


All Element and program samples in this screen are for the field unit being programmed only. If you choose to use the default the RTU will use the Default sample time, which we chose earlier in the FIU definition

If you would like to create new sample times, follow the instructions on page 73.

Modules tab:

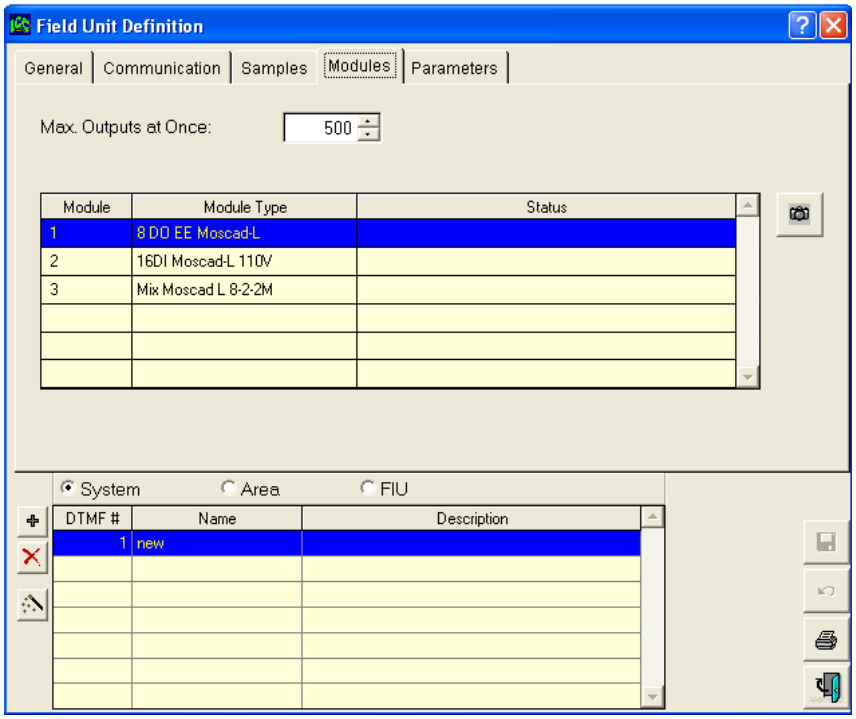
Each field unit is purchased with a set of I/O modules that allow physical connection to Valves, Counters, Switches, and much more. These modules need to be defined for each RTU. There are two ways of defining these modules.



1. Within the Module Type table click on the word "No Module" for the list of the modules to appear. Choose the module corresponding with this slot. It is important to choose the module that matches each slot; slot 0 is always the CPU.

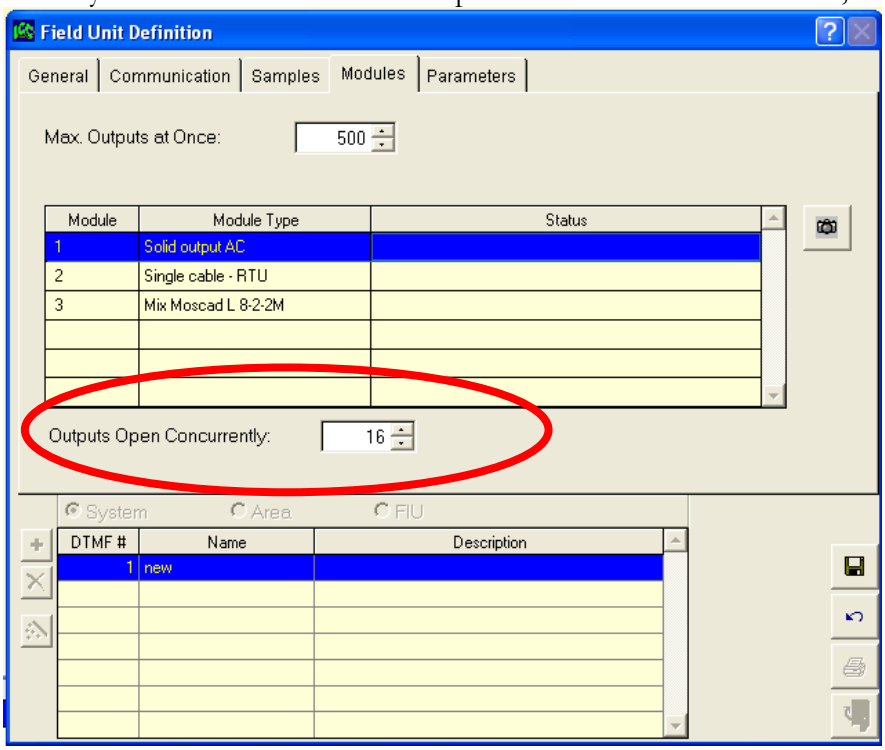
2. After the communication has been setup to this RTU, click on the "Camera" icon to sample the RTUs modules.

After the modules are defined there are some settings in this window that need



special attention.

If you have chosen a "Solid Output AC" as one of the modules, a new option

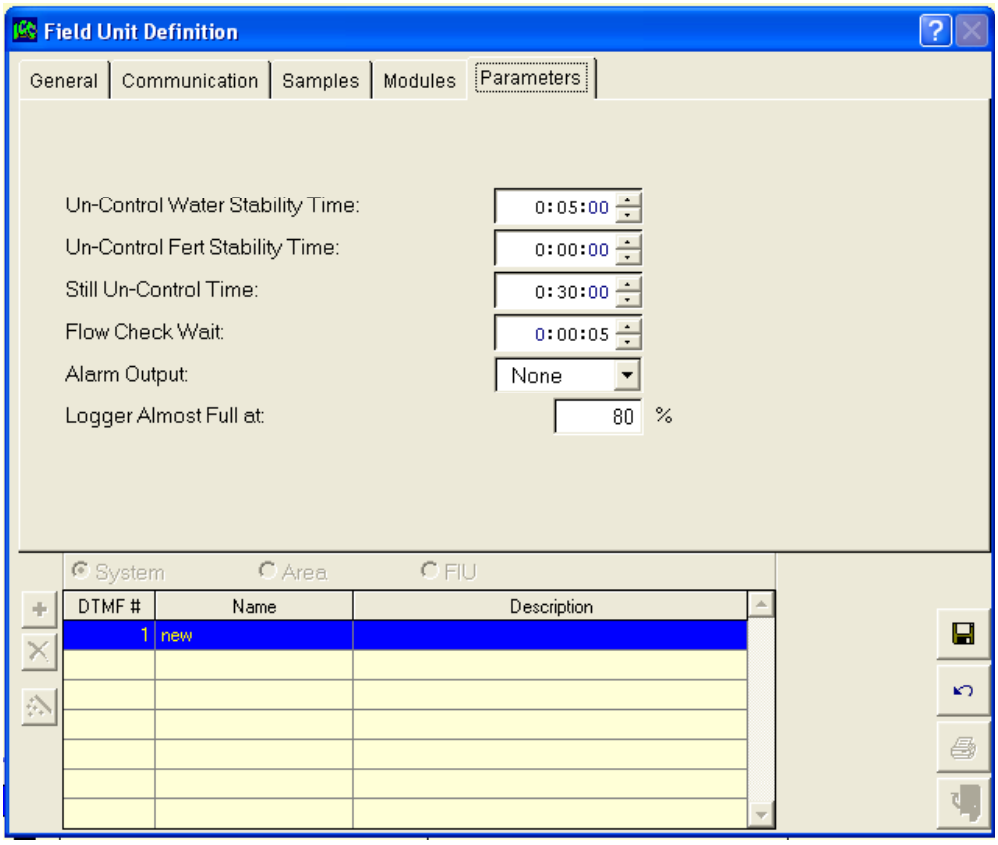


appears called "Max Outputs Open Concurrently": With AC module you may open all of the outputs at the same time

HOWEVER; the bottleneck will be the AMP allowed. To block over draw of power and blown fuses choose the "Maximum" number of outputs, which would correspond to the max AMP allowed.

Max Outputs At once: This field corresponds with the Maximum outputs allowed to be "Open" at once by the RTU. You may choose to open up to External Condition outputs all at once, however; the bottleneck will be the AMP allowed by the RTU's power supply and fuse. To block over draw of power and blown fuses choose the "Maximum" number of outputs, which would correspond to the max AMP allowed.

Parameters tab:



The parameters in this window will only relate to IRRInet-XL RTUs and CPU420's. We will review each parameter.

Un-Control Water Stability Time: In the "Irrigation" tab of "Main Line Definition" window there is an option to set "Leak Detection". There you will define how many pulses from the water meter would be a water leak. A water leak would cause the system to post an Event of "Un-Open Water" and shot off the line. Here, "Un-Control Water Stability Time", we will define the time, which the pulses must accrue in, in order for the alarm to be true. For example if this time is set for 5 minutes and the "leak detection" is set for 3 pulses, it means that the 3 pulses must accrue with in 5 minutes, other wise there is no alarm.

Un-Control Fert Stability Time: In the "Fertilizer" tab or the "Fert Pump Definition" window: In the "Irrigation" tab of "Main Line Definition" window there is an option to set "Leak Control After". There you will define how many pulses from the Fert Meter would be a fertilizer leak. A fertilizer leak would cause the system to post an Event of "Un-Open fertilizer" and shot off the Fert line. Here, "Un-Control Fert Stability Time", we will define the time, which the pulses must accrue in, in order for the alarm to be true. For example if this time is set for 5 minutes and the "Leak Control After" is set for 3 pulses, it means that the 3 pulses must accrue with in 5 minutes, other wise there is no alarm.

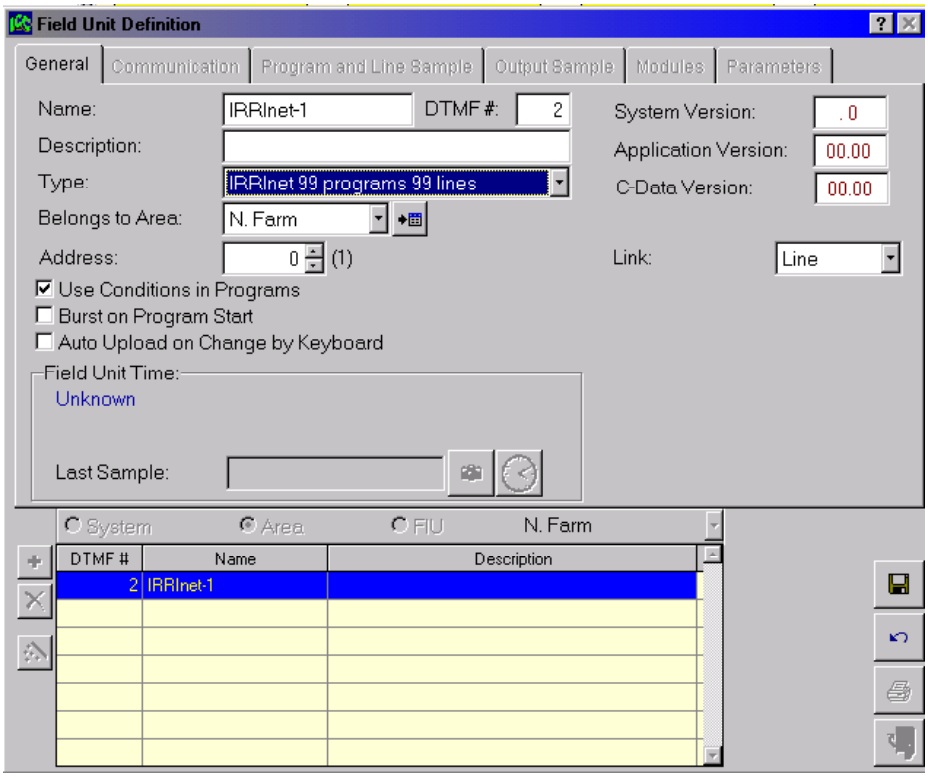
Still Un-Control Time: After an Uncontrolled Water (unopen water) alarm has been reported; you may choose how often to check if the alarm is still true. Here you will set the time for the RTU to check for the existence of uncontrolled water alarm (unopen water). For example if this time is set to 30 minutes the RTU will check for the existence of the alarm every 30 minutes, if the alarm still exist (still unopen water) the RTU will then send another alarm to the central.

Flow Check Wait: In irrigation system when there may be "Virtual Meter(s)" where one meter may be a different RTU than others, there may be delay in receiving the latest data from all RTUs to calculate true flow. Set the delay for such meters on this RTU within this field

Alarm Output: Once the outputs of this RTU have been defined you may choose one to close when there is an Alarm on this RTU. Choose this output from the drop down menu.

Field Unit Definition: (IRRInet)

Adding an IRRInet:



Choose the Area in which you would like to add this RTU to, you may choose this area from a preexisting one by checking the flag by Area and choosing the area fro the drop down menu, or you may choose to create a new area (after creating your field unit) by clicking on the table button next to "Belongs to Area".

Name: Click on the "+" to add a new RTU.

Description: Type in the "Name" of this RTU and fill in the "Description" which would be helpful with the identification of this RTU.

Belongs to Area: Choose the Area this field unit is going to belong to.

Address: Type in the address of this RTU, you may choose any number from 0 to 8000.

Use Conditions in Programs: We will review conditions in later part of this manual, choose whether Conditions (Internal, External, and Logic) will be used during writing of programs for this RTU.

Burst on Program Start: Checking this flag would force the RTU to send an event to the central on start of programs.

Auto Upload Change by Keyboard: If this flag is checked the RTU will send all changes by keyboard to the central. An event will mark popup on such changes.

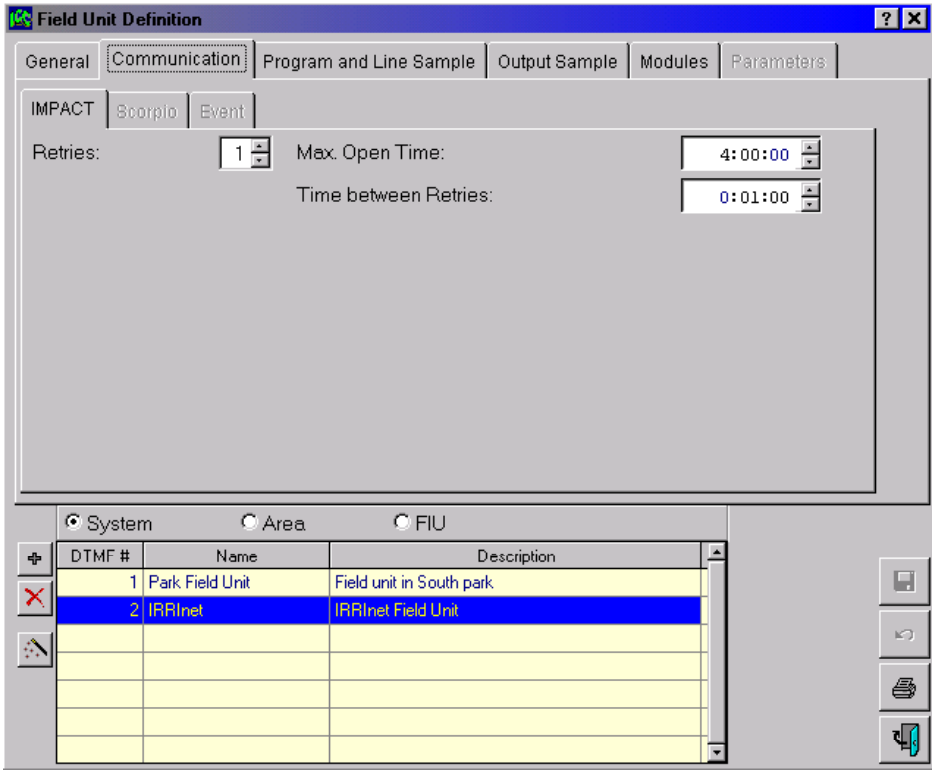
Link: There are only two options here, unlike IRRInet-XL. The two options are either line or radio. Choose the communication method of this field unit from the drop down menu.

Last Sample: After the first communication is established with this field unit, the last sample time of this field unit will appear in the box immediately in front of the "Last Sample". The operator may sample the field unit by clicking on the camera.

Once communication is established with this field unit you may click on this button to sample the field unit.

Click on this button to synchronize the field unit time with the PC time.

Communication Tab:



Under the "Irrigation Tab" of IRRInet, Scorpio and Events are grayed out. IRRInet is not capable of defining these options, however; you may define some settings for IMPACT.

IMPACT:

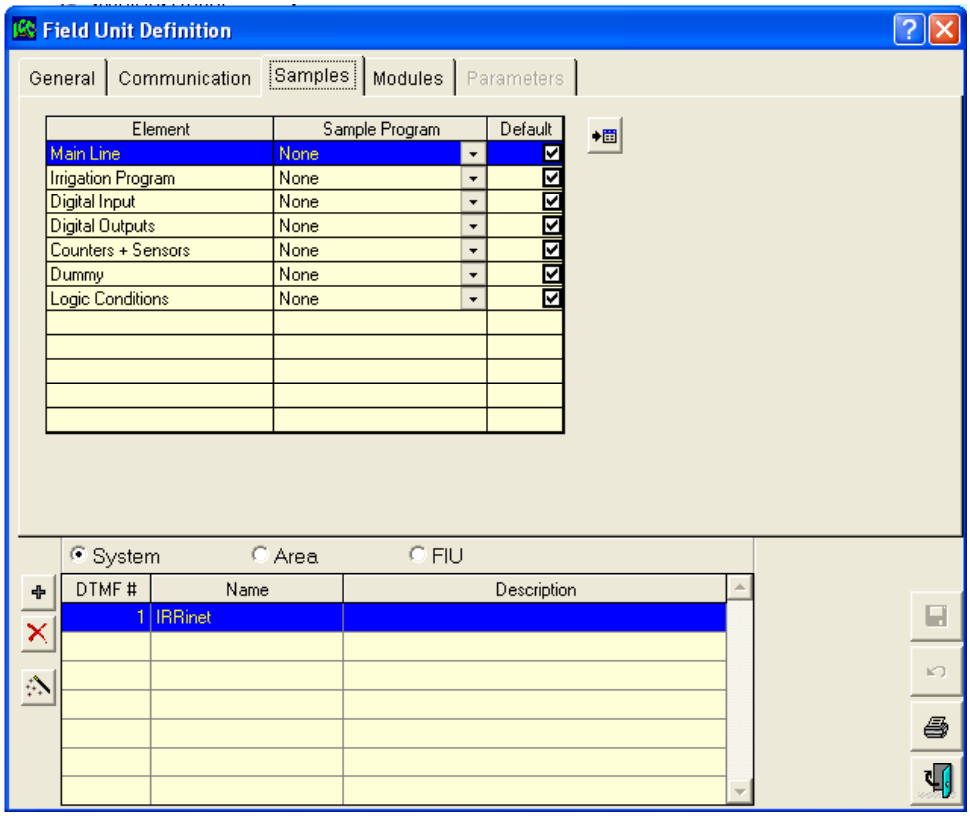
Retries: Choose the number of retires for each message to the IMPACTs attached to this RTU, by either typing the number or using the up and down arrows.

Max. Open Time: It is possible that an IMPACT with low battery, may not receive "close" transmission for the central no matter how many retries are sent by ICC. Max Open Time, the time sent out with each transmission for open. If this time is set for 4 hrs for example, the IMPACT will close the valve, at 4 hrs, even though it has not received the close message from the central.

Time between Retries: The length of time between each one of retries. This is the length of time the RTU should wait before resending messages to its IMPACTs.

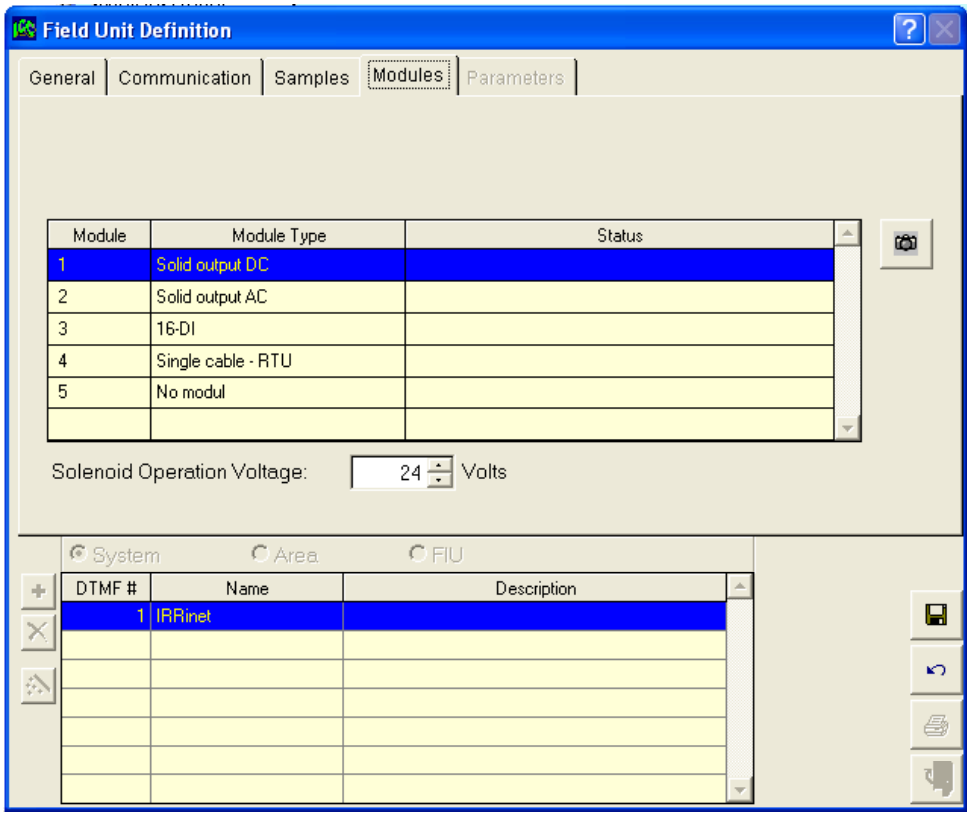
Samples tab:

Sampling of an IRRInet follows the same scheme of an IRRInet XL or XM please refer to the XL/XM sampling section (page 100). An IRRInet however has sampling options comparing to an XL or XM unit.

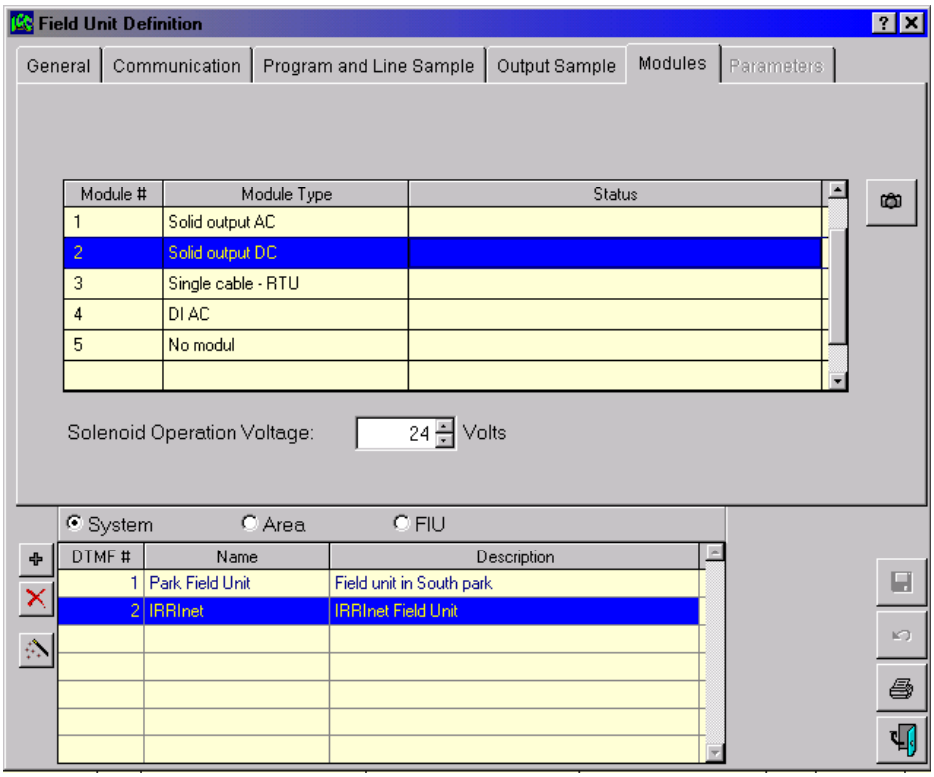


Modules tab:

Each field unit is purchased with a set of I/O modules that allow physical



connection of the valves; these modules need to be defined for each RTU. There are two ways of defining these modules.



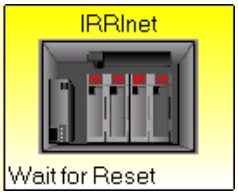
Within the Module Type table click on the word "No Module" for the list of the modules to appear. Choose the module corresponding with this slot. It is important to choose the module that matches each slot, slot 0 is always the CPU.

If one of the modules happens to be a "Solid Output DC" and new option appears asking for Solenoid Operation Voltage: This option only exists for the DC outputs. Choose the correct voltage and click "save" to go on.

There is also an easier solution to define the modules in this RTU, if the communication has already been established with this RTU, click on the "Camera" icon to pull the RTUs data.

Upload/Download Wizard:

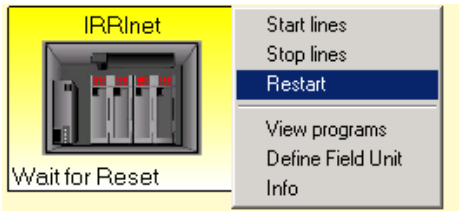
After defining a field unit, it is essential to download this new data to the RTUs. There are many cases where an RTU reset is necessary. ICC will prompt you



when you need to reset an RTU.

The RTU will also display "Wait for Reset", when a Reset is needed.

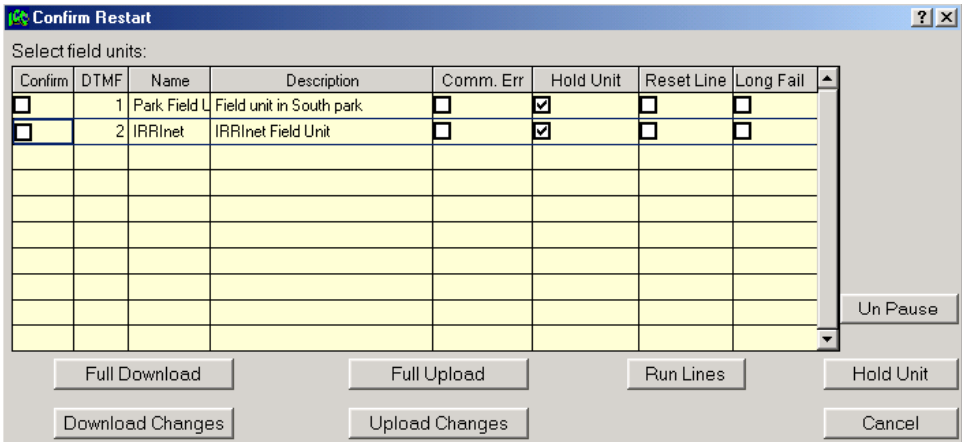
There are several ways to go to the Reset Or Upload Wizard Screen. From the



"Field Unit Definition Screen" you may click on the "Wizard" icon , or you may right click on the field Unit.

In the User or Fixed screen and choose the option "restart".

A new window will appear.



Reset of a field unit allows the central software to reset and then display the data you see regarding this field unit at the central. First "confirm" the check box on the left, and then click on Upload or download. You may also check one or more of the boxes it the adjacent columns. Such as Comm Err…

Comm Err: If this unit has a comm. Fail this flag is checked. You may not upload or download to this if this box is checked.

Hold Unit: If this RTU is on hold, this box will be checked.

Reset Line: One or more main lines on this field unit need restart.

Long Fail: If an RTU has a long power fail, it needs to be reset

Full Download: Downloads all the data from the ICC, in regards to this RTU, to the RTU over writing the current Data in the field unit. If you have programmed this RTU using a keyboard the data will be replaced.

Full Upload: Uploads all data from the RTU to the Central (ICC). All the data in ICC will be replace with the exciting data in the field unit.

Run Lines: Opens all the main lines on this RTU.

Hold Unit: Stop all communication to this field unit.

Un Pause: Resume all communication to this field unit.

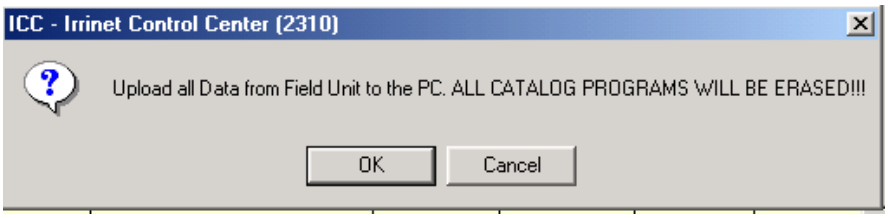
Download Changes: Downloads the changes you may have made in ICC to the Field Unit.

Upload Changes: Uploads the change you may have made by keyboard at the field unit to the central.

Upload/Download Wizard Continued:

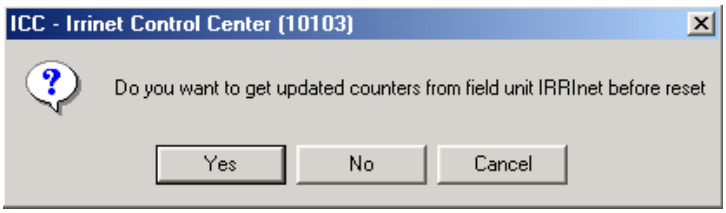
Short Upload should only be used to pick up changes made in the field to the programs and program status tables. If the field or line definition tables have been changed, this will require a full upload

UPLOAD: After checking the flag for Upload and clicking ok a popup will appear…



It is important to note that Catalog Programs will be deleted after an upload from the field unit. Catalog Programs are offline programs you may write for an RTU.

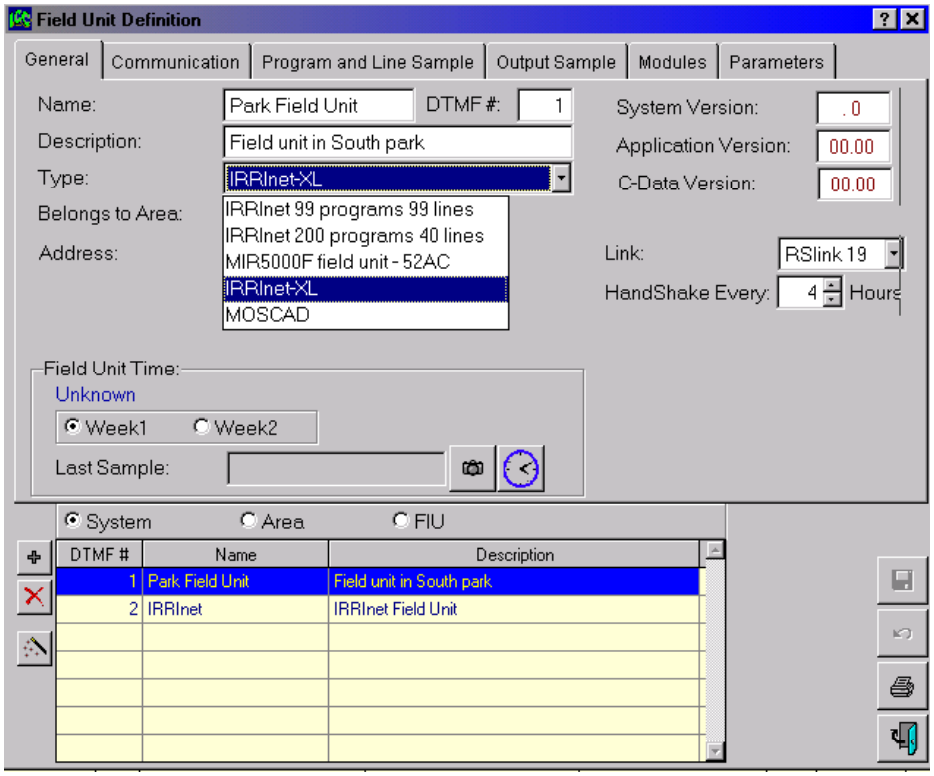
DOWNLOAD: After Checking the flag for full download and clicking ok the following popup will appear.



Updating counters are important if you are keeping track of water usage by either using ICC's "accumulation" or manually. When a download is done all such data in the RTU is deleted and replace.

The event-logger will popup with a new event when the upload or download is finished.

Field Unit Continued:



There are 3 other types of field units in ICC. "IRRInet 200 Programs 40 lines" and MIR5000F field unit – 52 AC" are programmed just like an "IRRInet 99 programs 99 line" and MOSCAD is programmed just like an IRRInet-XL.

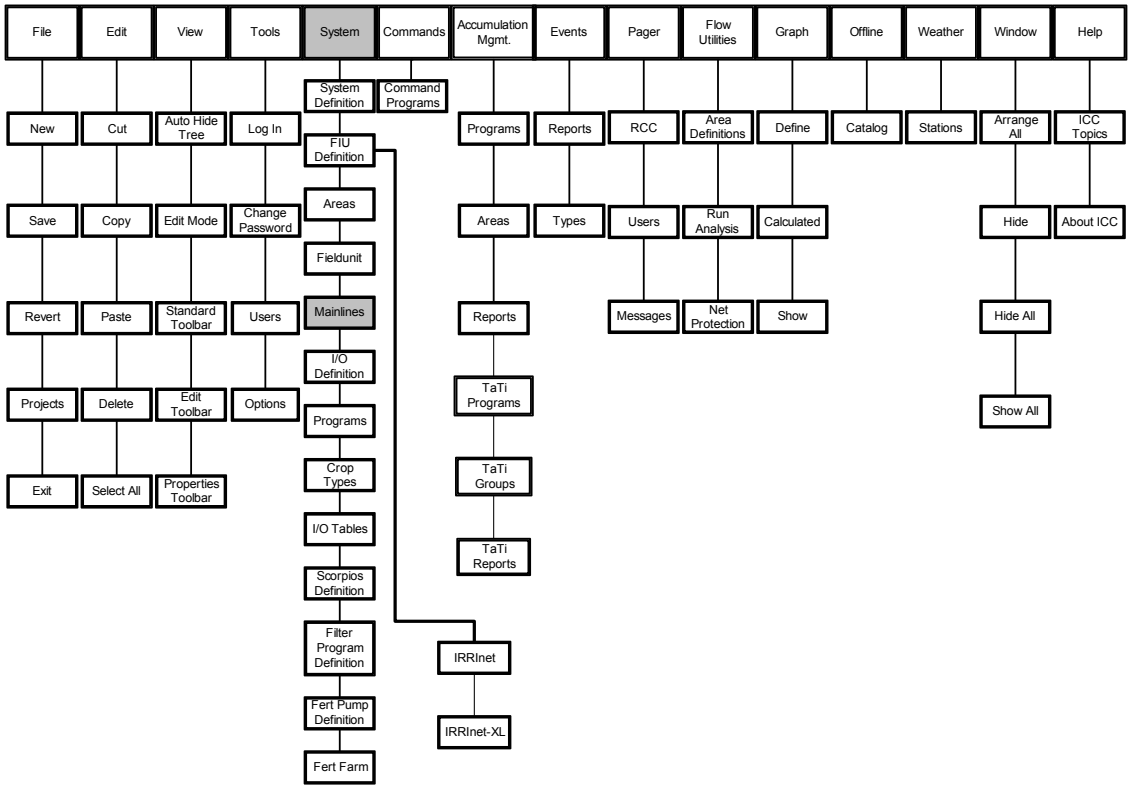
MIRF5000 Condition0F Field unit – 52 AC: Is a legacy product of Motorola, which is no longer available. However, ICC supports the 52 Station AC model.

If you have F-Unit within your system the simplest configuration will be to define the unit and program it VIA keyboard in the field. Then use the upload option to upload the field unit. The MIR500F unit has a proprietary Physical Connections setting, which is explained in detail in MIR5000F Unit manual.

Main Line:

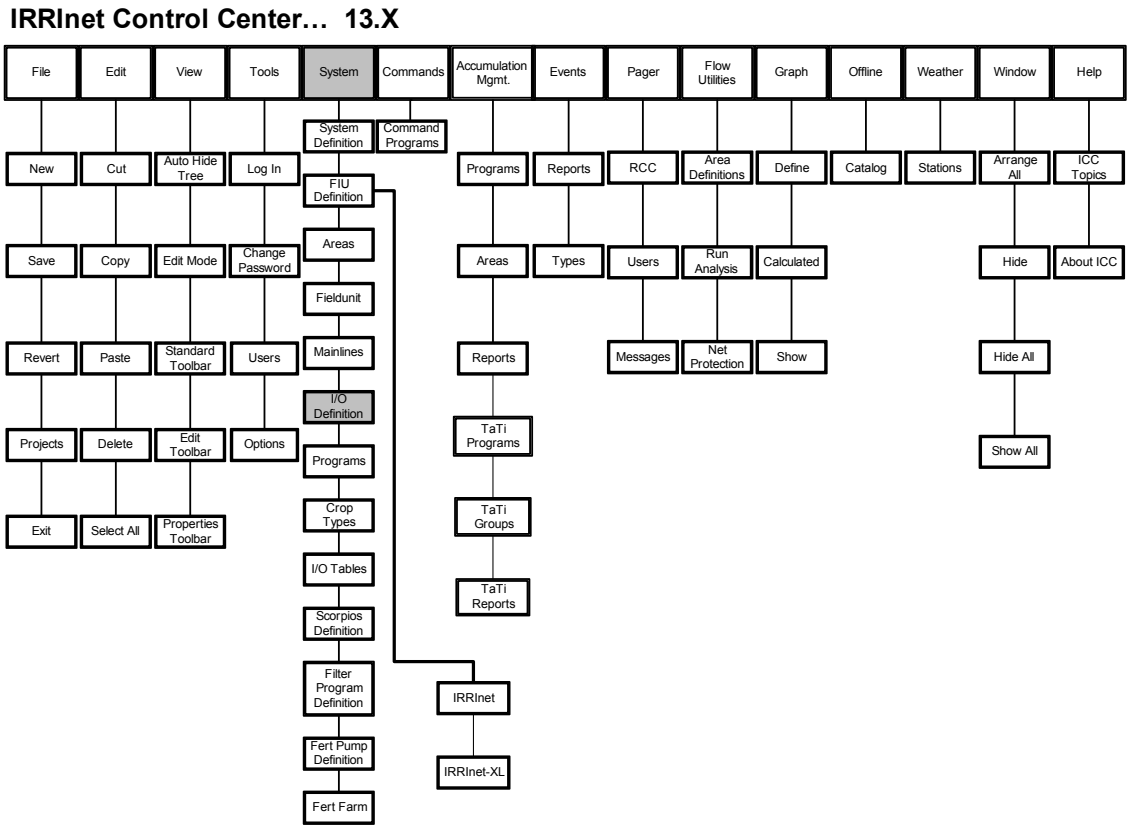
We should take a note here; up to now we have defined our FIU, areas and Field Units (RTU). The next step would logically be to setup "Main Lines". However when setting up main line you will have to add it's valves, main valve, meters and so on to the main line. There fore we are going to continue this next section with first covering the outputs and inputs and then coming back to main lines.

IRRInet Control Center… 13.X

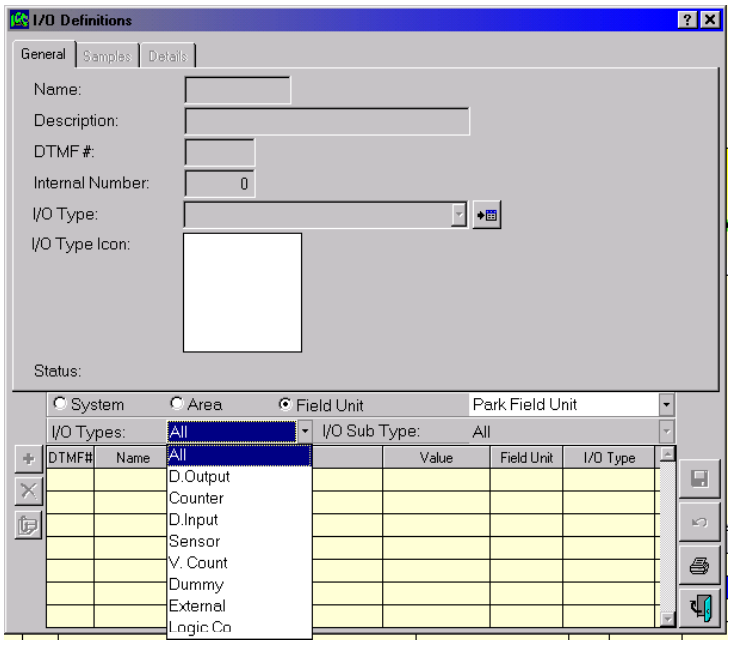


In this section we will cover all possible I/O offered by ICC and how to add more types of I/O using "I/O Types" option.

I/O Definitions:



From the file menu click on the System and choose "I/O definitions".



A new window will open:

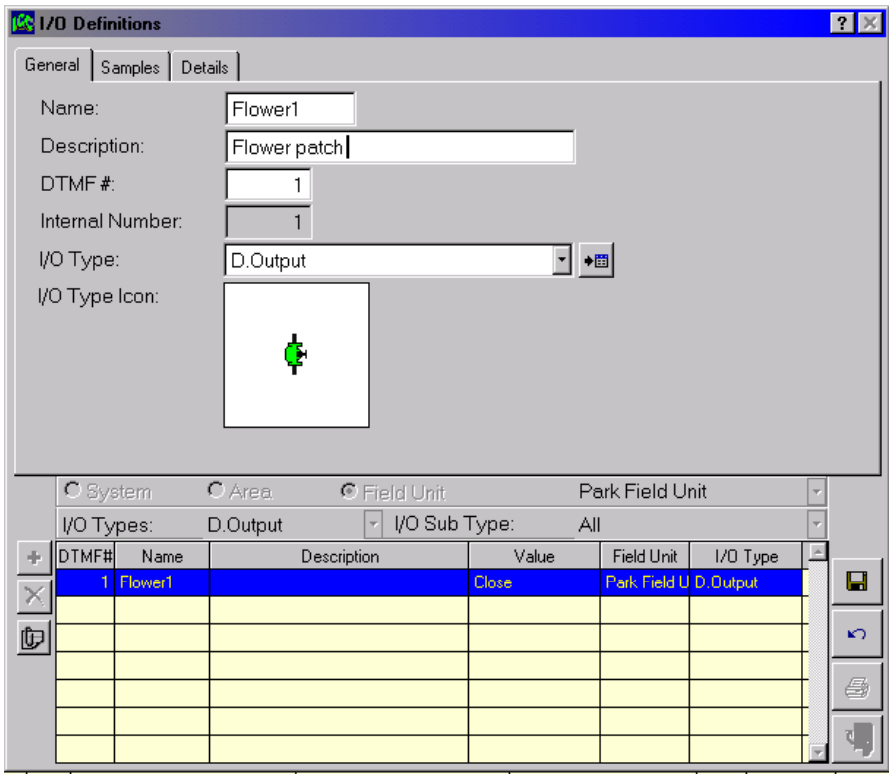
Before choosing the type of I/O first check the flag for the field unit to chose the field unit which the you are adding the I/O too.

The "+" button becomes available once an I/O is chosen.

I/O Definitions:

Digital Output:

To add a digital output click on the "I/O Type" drop down menu and choose "D. Output"



Click on the "+" to add a digital Output.

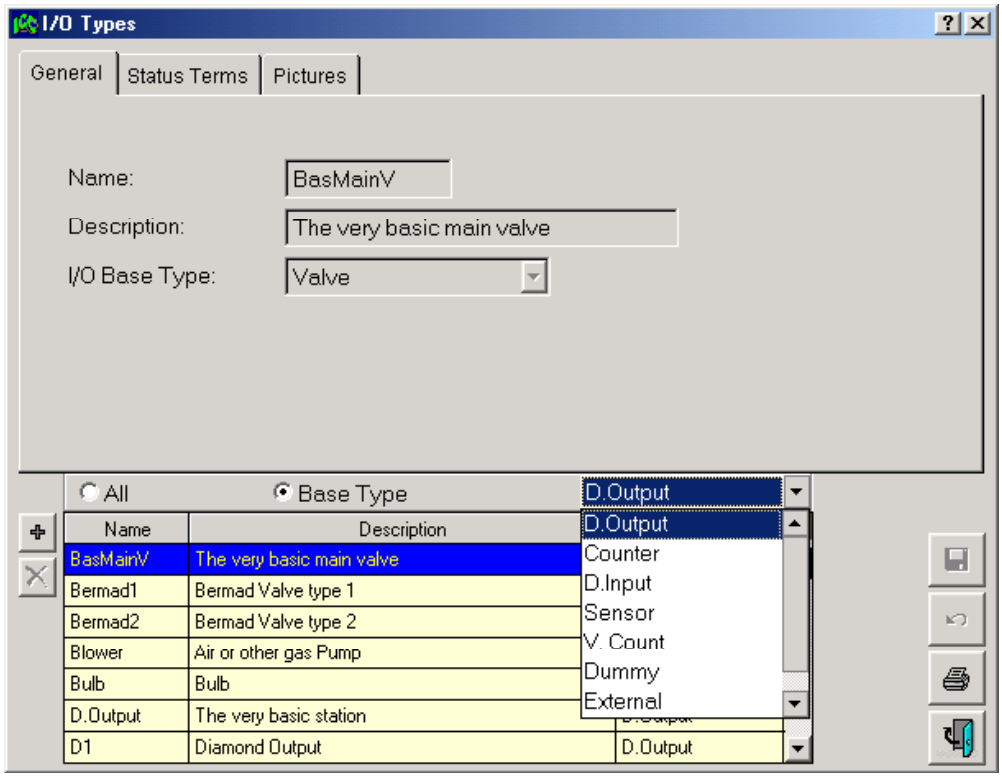
Name: Choose a name that is familiar and easy to remember. You may use up to eight characters in the Name field.

Description: Type in the description of this Output, here you may type in up to 32 characters.

DTMF#: If you are planning to use DTMF this is the number that will be associated with this output, in order to manipulate this output you will need to enter the DTMF number for this filed unit and output.

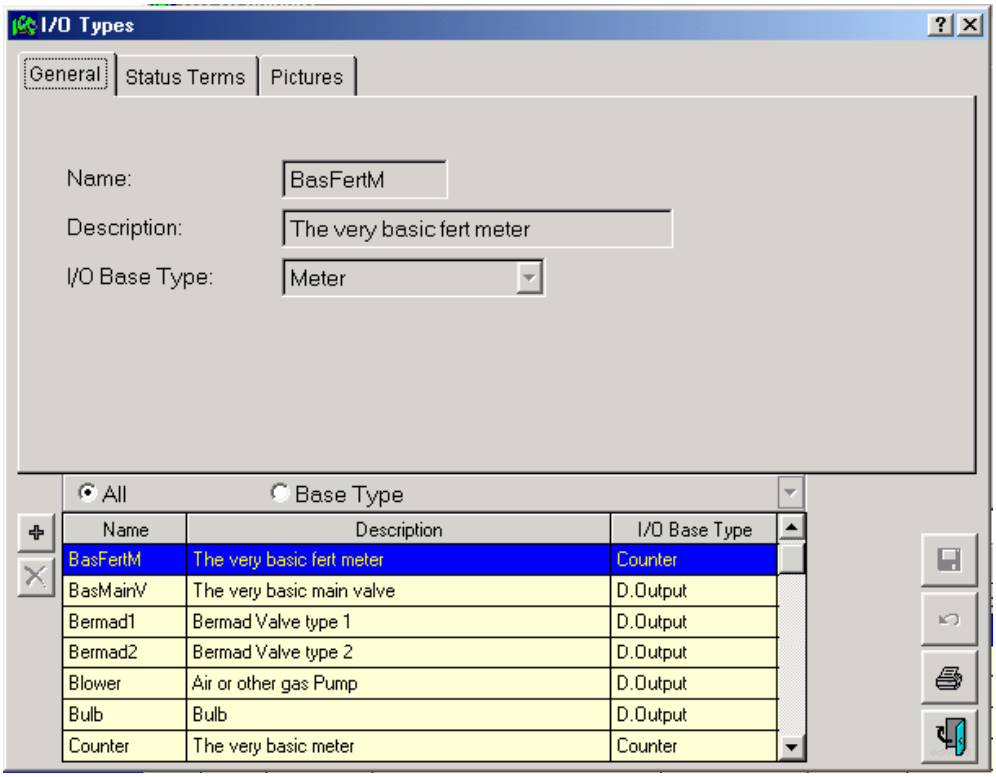
Internal Number: Internal number is the number used by the field unit as a reference number. This number is a static number is not changeable by the user. Do not use this number as a reference.

I/O Type Icon: Chose the icon for this I/O. This is the Icon that will be displayed in the user screen, ICC has 32 different types of I/O you may add. However you may also create your own I/O by clicking on the table icon by the I/O type.



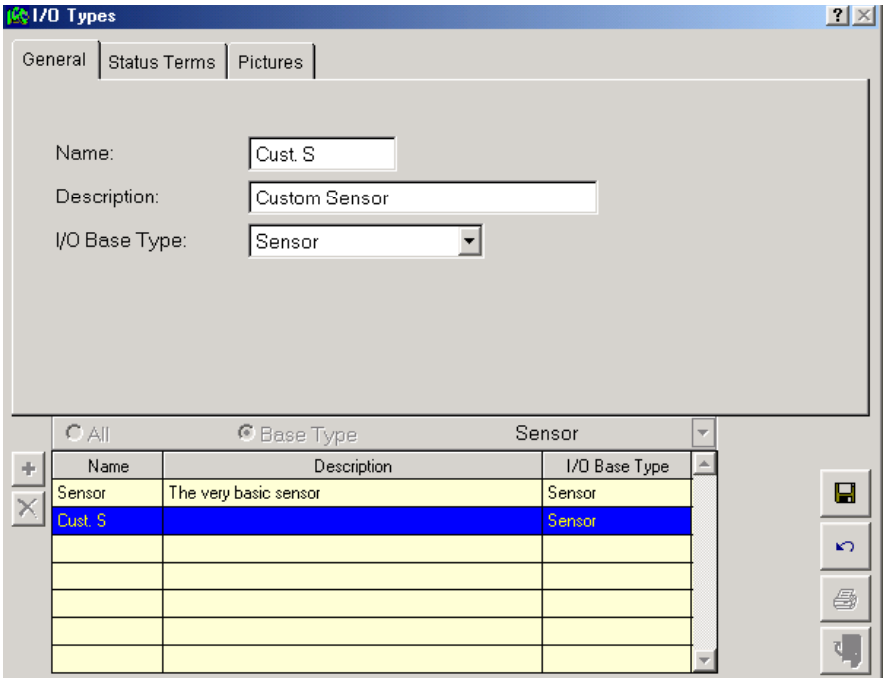
A new window will open: **I/O Types:**

Even though ICC provides the user with an extensive choice of I/O types, there are also many more I/O types, which the operator may create and add using this option you may create a new type for I/O.



Chose the Type of I/O or check the box by "Base Type" to narrow the selection.

From the drop down menu choose the Type of I/O you are adding.

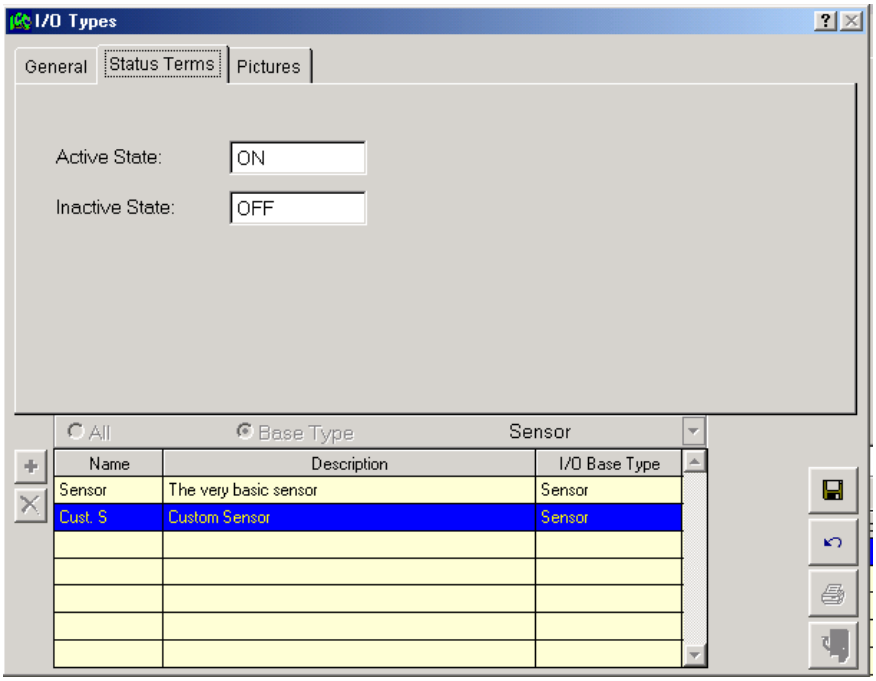


Click on the "+" to create new.

Type in the "Name" and the "Description" of the new element.

If you have changed your mind of the type of I/O you may choose from the I/O

Base Type drop down menu the type of I/O you are creating.



Status Terms Tab:

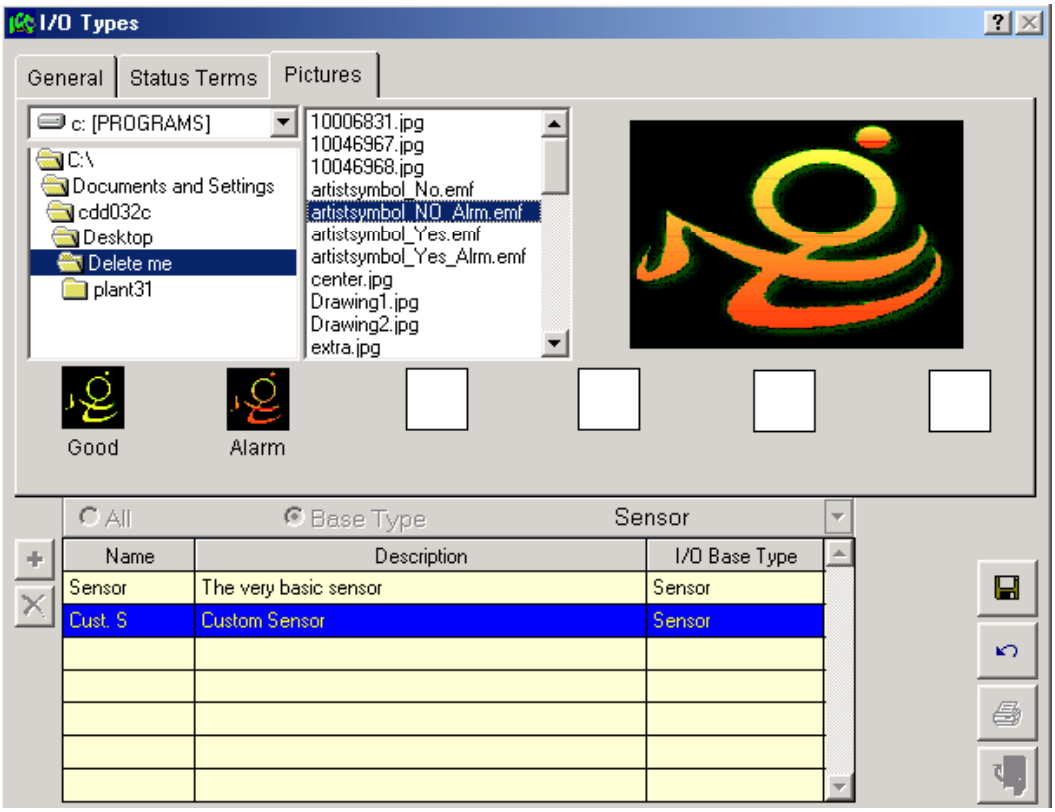
Click on the Status Terms Tab:

Type in the words describing the state of this sensor when "Active".

Type in the words describing the state of this sensor when "Inactive"

Click on the "Pictures Tab"

Pictures Tab:



Locate the pre drawn pictures on your hard-drive. These pictures can be created previously using drawing software. Make the pictures distinguishable by color. Yellow and Red for example mean alarm and so on.

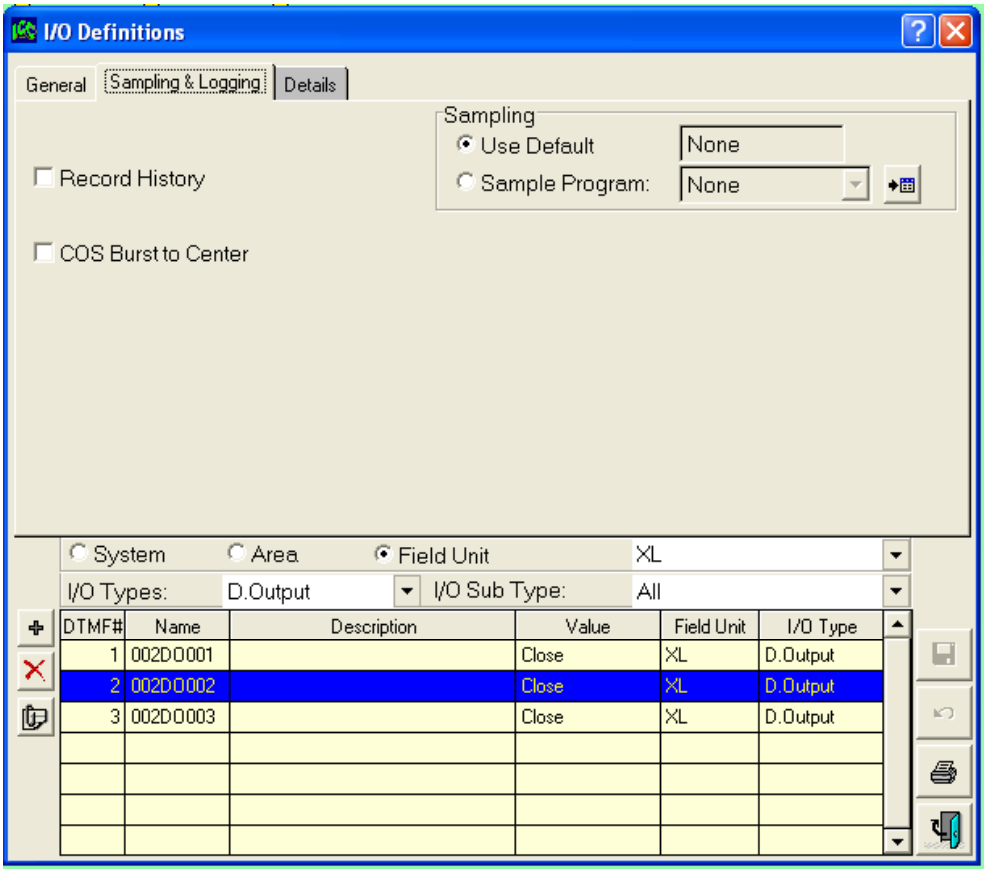
Drag and Drop the picture in the field relating to Good, Alarm, etc.

Click on "Save".

I/O Definitions Continued:

Before we got into I/O types and adding icons we were talking about adding a new I/O definition. We have covered the general menu. Let us continue to the next tab "Samples"

Samples Tab:



In this screen you will get to choose how often to sample this new I/O. Let us review these options.

Use Default: When this flag is checked, ICC uses the default sample rates chosen in the "FIU Definitions" window.

Sample Program: To customize the Default Sample Rate for this I/O click on the table icon after checking the flag. The sample popup window is the same as the sample window we reviewed for field units.

Record: Check this flag if you want to record the amount of water usage from this output. This will allow you to graph the data using the graph option in ICC.

COS Burst to Center: Check this flag if you want the changes in the state of this I/O to be sent to the center (COS = Change of State).

NOTE:

It is possible to set more than one sample time; however you should always take into count radio communication and radio traffic that may be generated.

Consider a typical system of Digital Output, with 60 mainline and 6 Field Units.

If you are sampling each twice a day, you are initiating.

(Digital Output X 2)+ (60 X 2) + (6 X 2) = 1332 communications a day, just to sample. Remember that ***ICC is a live system*** and any change of status in the field is always sent to the central.

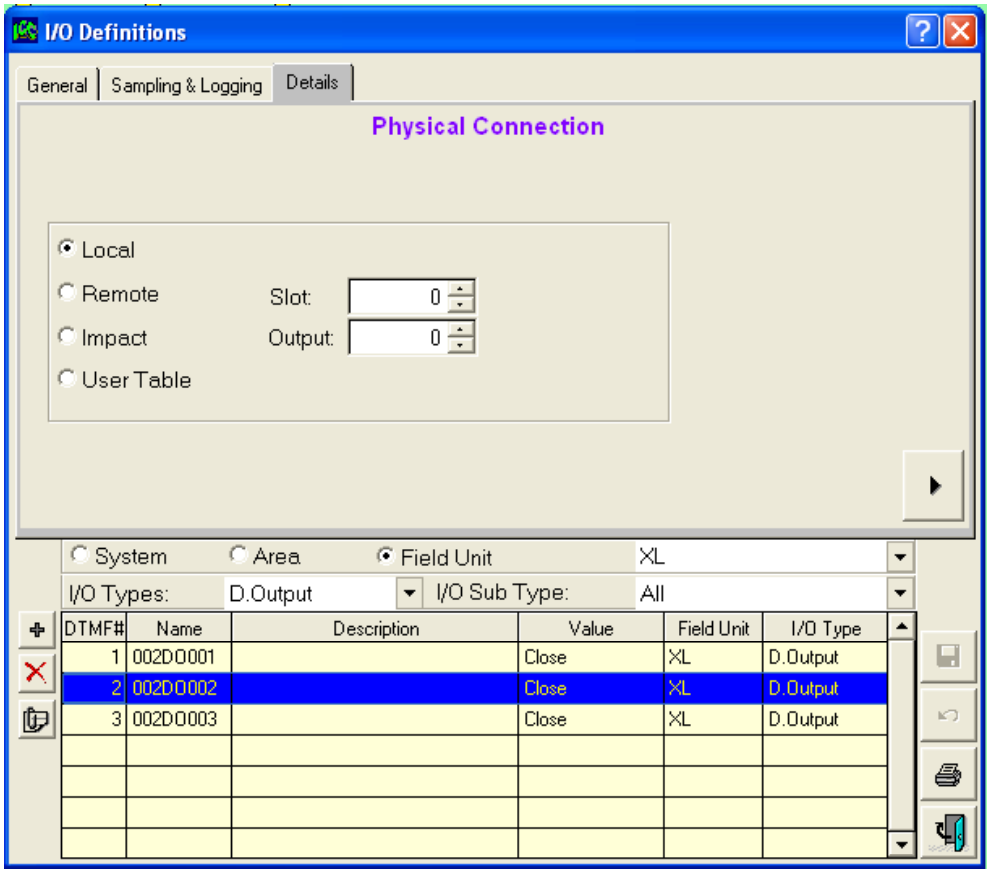
If it is essential when setting the sample time for each output and input to set the communication for a time of the day when the communication traffic is at its lightest.

Details Tab:

In this window we will choose the Physical Connection of this I/O.

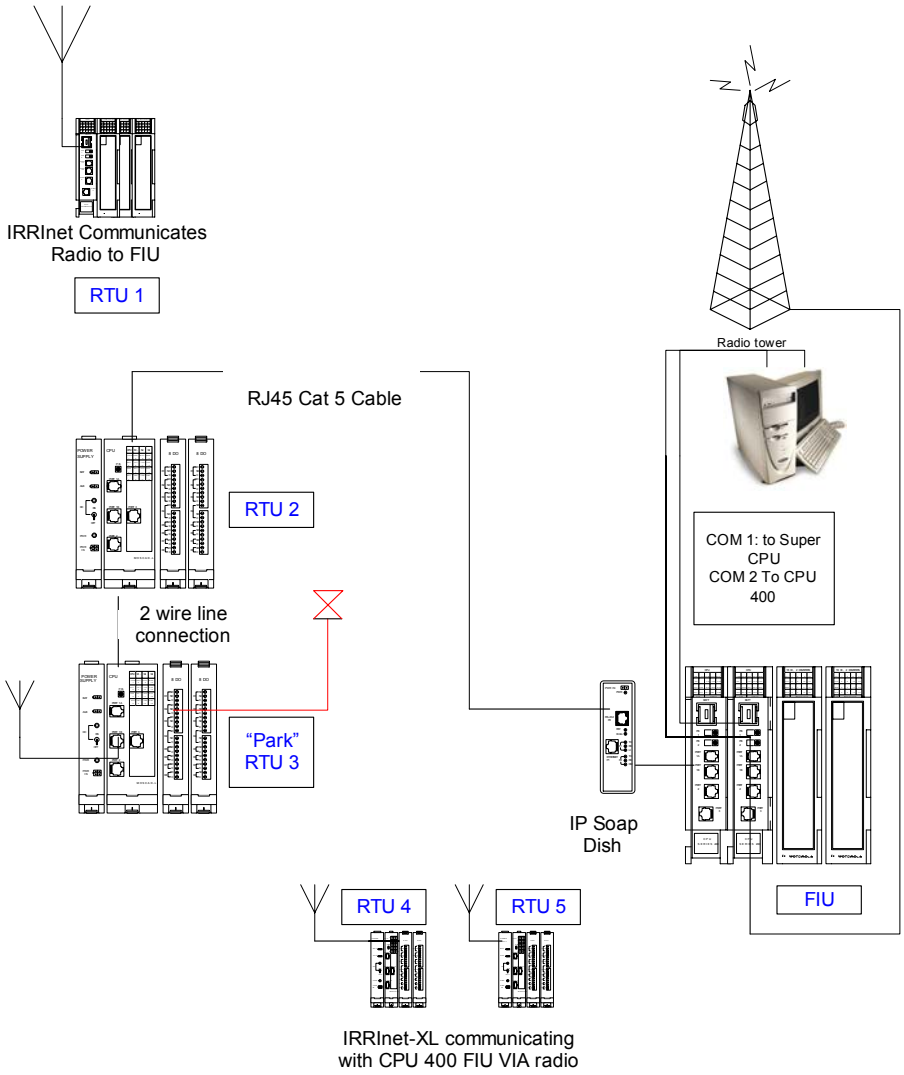
An I/O may be either connected directly to the RTU, Scorpio, IRRIcom or an IMPACT. We have to define this connection letting ICC know where to get and send data of this I/O to.

In an IRRInet, Slots are numbered 0 to 5 (Where slot 0 is the CPU)

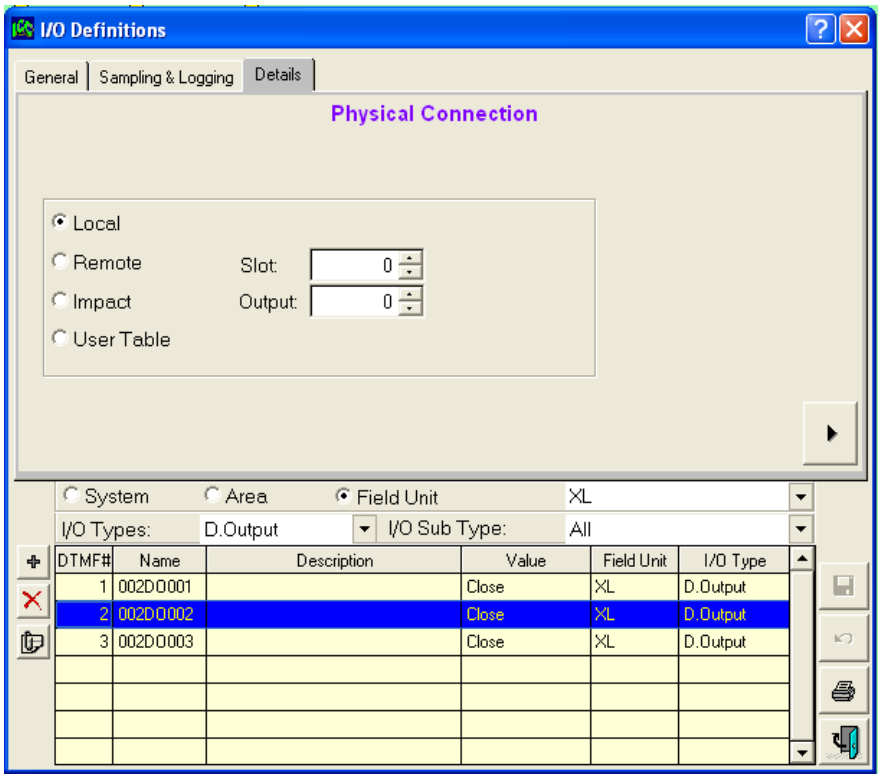


Let us consider our system, on the next page.

There is a valve connected to output 4, module 1, RTU 3 (Park). Let us set this physical connection in ICC.

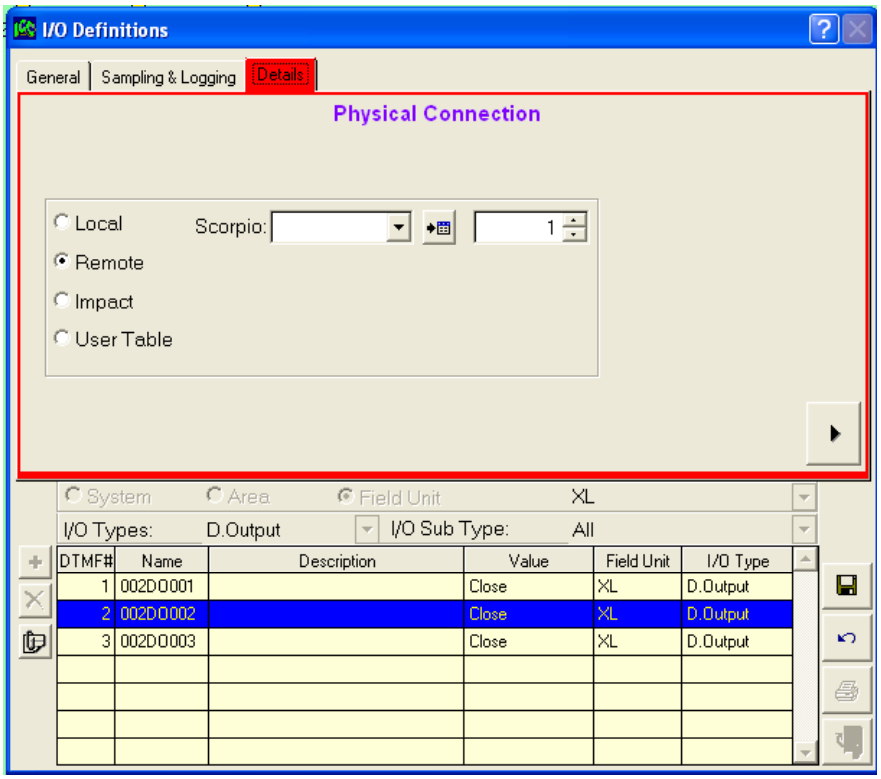


Details (continued):



Since the physical connection is local we have checked the local flag, however there are other types of physical connections.

Scorpio: Once the Scorpio flag is checked a new set of options will appear.

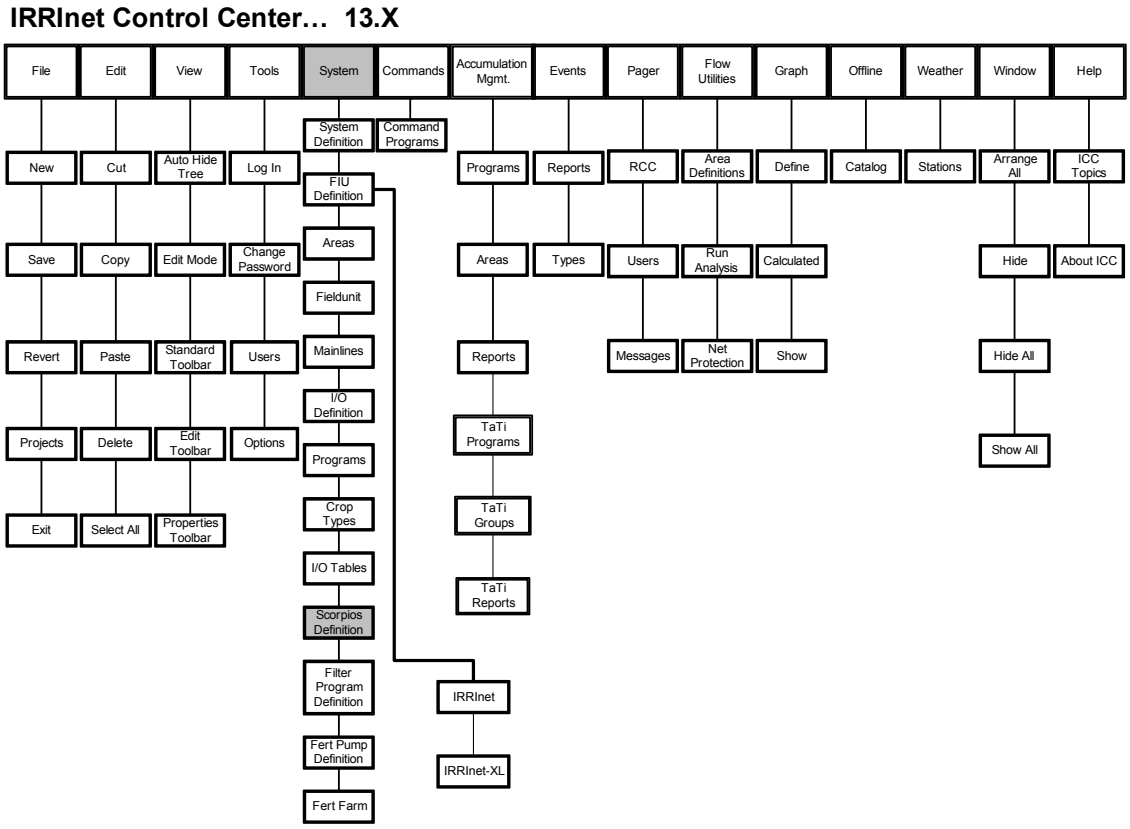


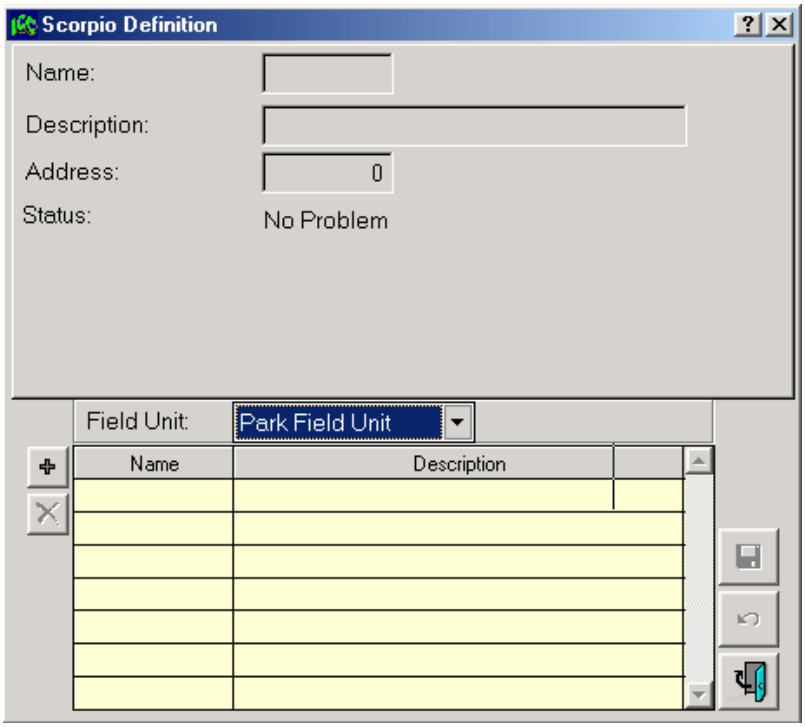
First note that the color of the fields turned "RED" This is because we haven't yet added any Scorpio to this project. However; just like we have seen many times before the Table icon to the right of the Scorpio will take you to the "Scorpio definitions" window. Each Scorpio has 16 output or 32 with an optional piggy back card.

Scorpio Definition:

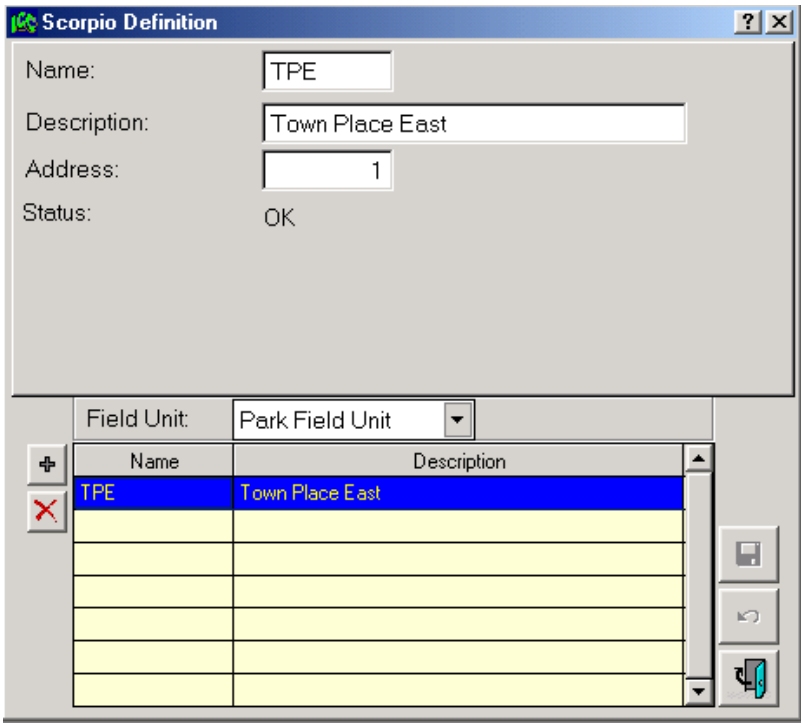
This window will list all the existing Scorpios within this project. You will be able to modify addresses, add and delete Scorpios.

You may also get to the Scorpio Definition by using the menu bar of



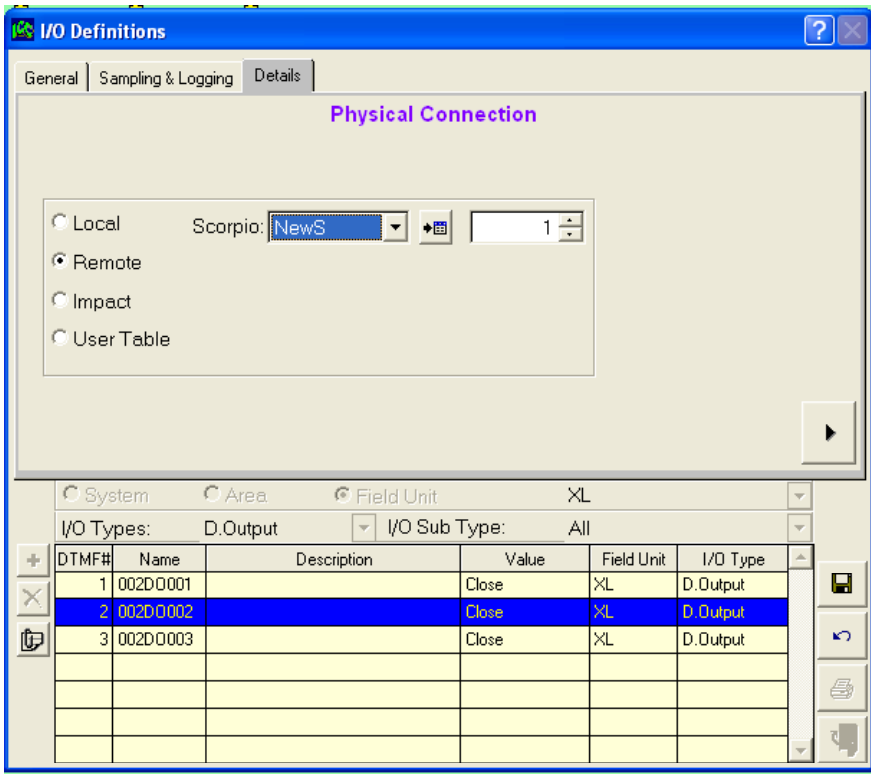


From the drop down menu choose the "Field Unit" which you are adding this Scorpio to. Click on the "+" button and type it the "Name" the "Description" of this Scorpio.

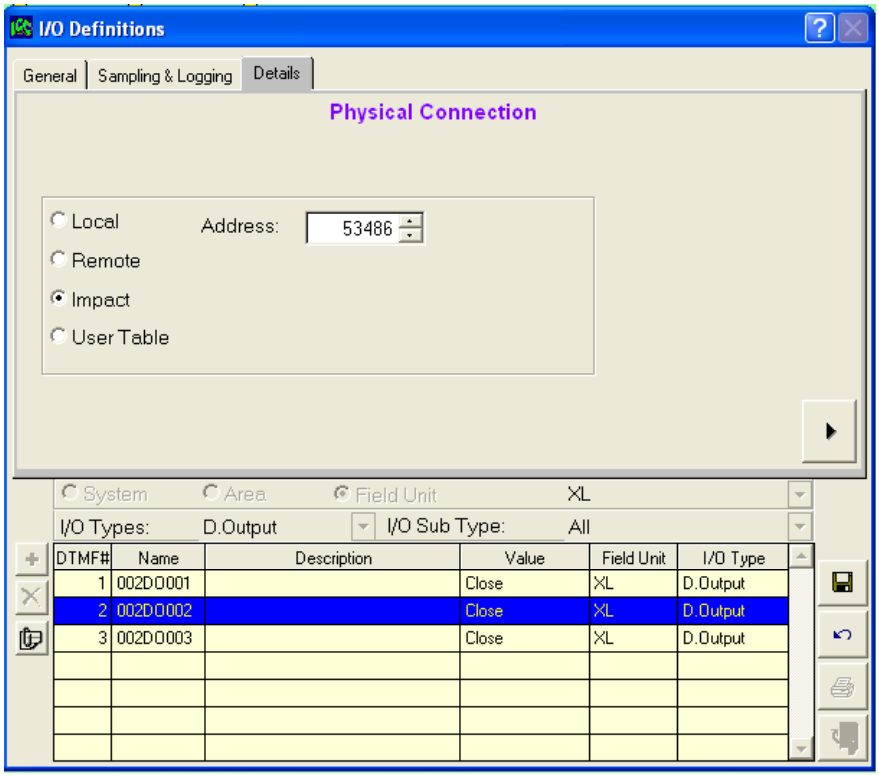


Type in the address and click Save.

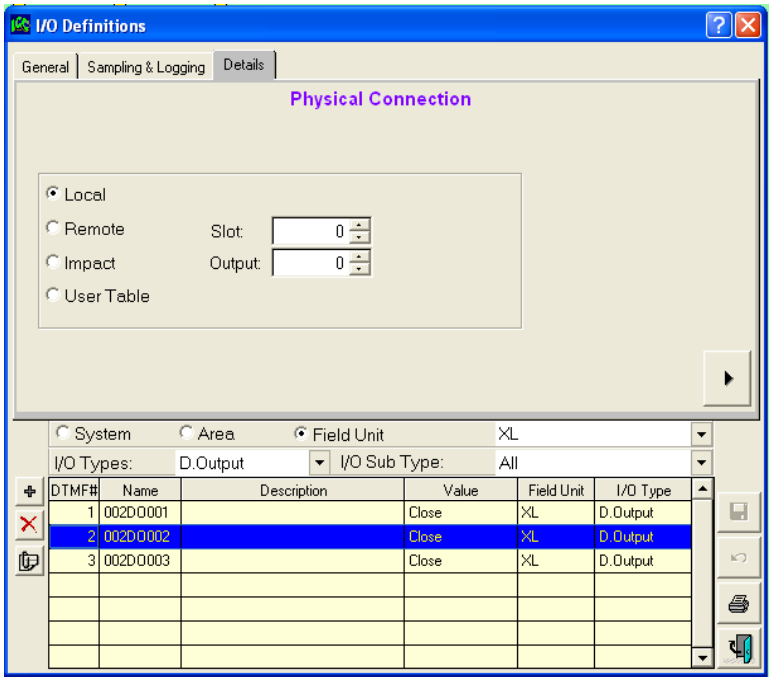
Once a Scorpio is setup under this field unit you may choose it from the drop down menu of Scorpio and type in the output number.



IMPACT:



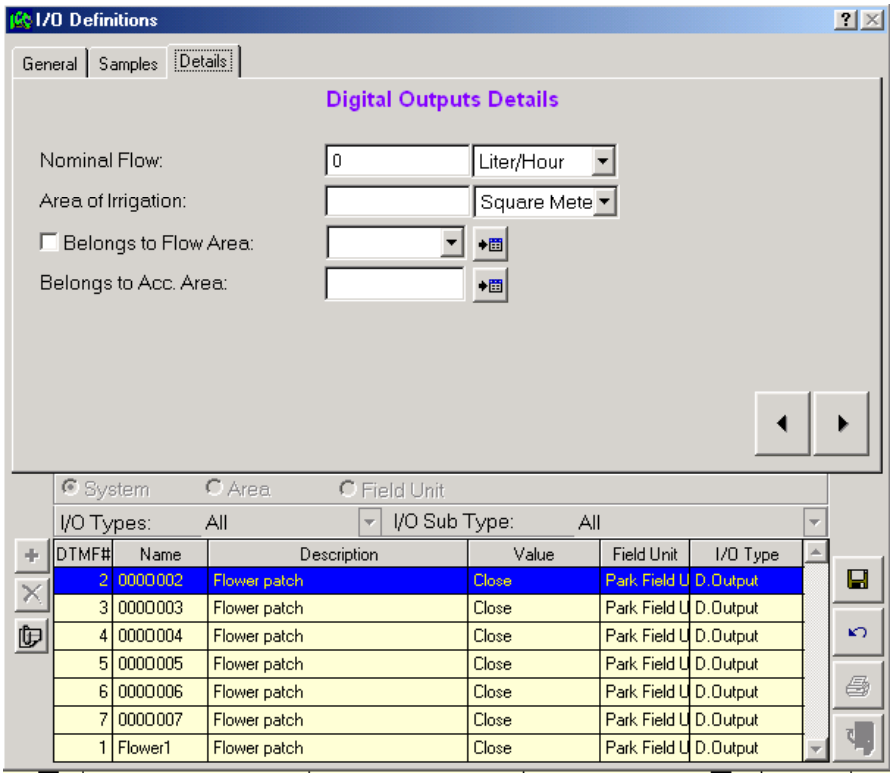
IMPACT: If this output is located on an IMPACT check the IMPACT flag and the set of options will change, the only options available will be the address field and the output number.



The Arrow options in the "Physical Connections" screen are to setup details and specific information regarding the I/O.

For the output we just created, the following options exist.

Click on the button to access the "Digital Output Details" Screen.



In the new window the following options exist.

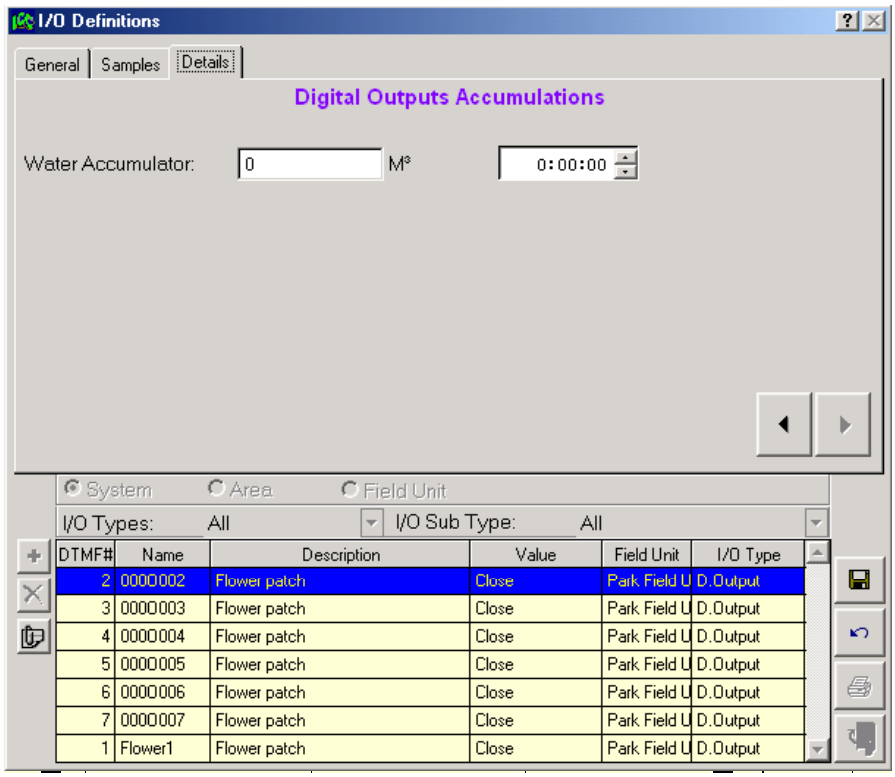
Nominal Flow: Actual flow.

Area of Irrigation: Define in the size of the area you are irrigating. You may use the drop down menu to choose the value for this area. This area measurement is used for reference in irrigation programming if you choose to water based on depth.

Belongs to Flow Area: Flow Area's which we will cover later in this manual, is a prediction tool for amount of water

Belongs to ACC. Area. Later in this manual we will review how you may have multiple valves on one accumulation program and how to display them in one view. If you have already reviewed the accumulations and would like to add this valve to an accumulation area you may make your choice here.

Click on the button to continue with more details settings of this Digital Output.

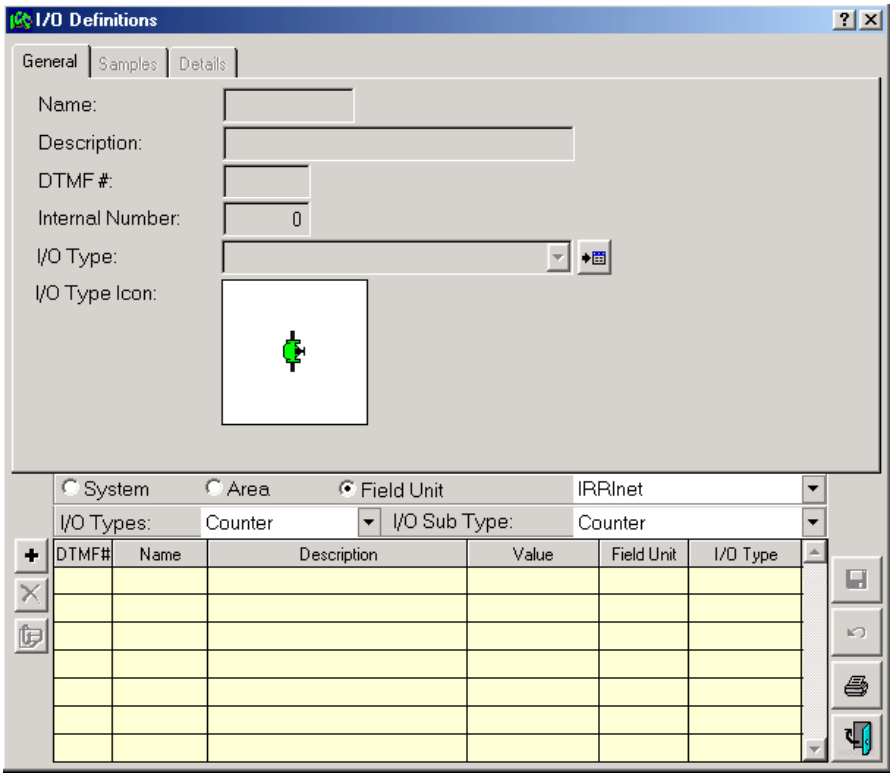


Digital Outputs Accumulations:

Water Accumulator: Quantify Accumulation for this output. The M3 will be changed once a Meter is defined "for the line which this output is connected to" with it's own quantity. The timer to the right of this parameter is the total accumulation run time for this output.

Counters:

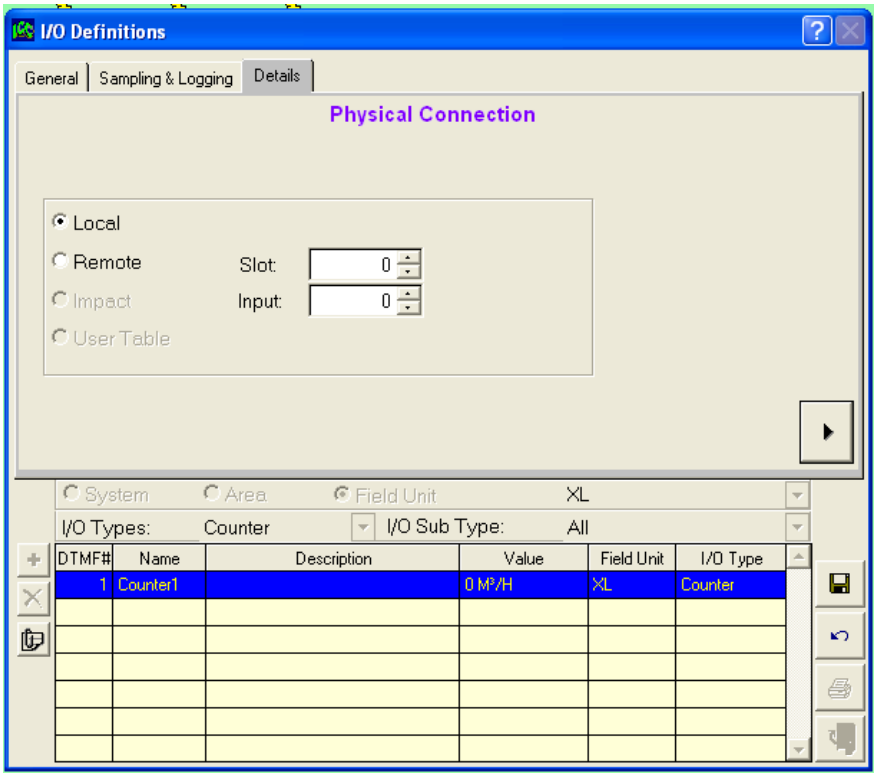
To add a counter: Click on the "System" on the main menu and choose the ""I/O Definitions" from the drop down menu.



- Choose the field unit for this counter.
- Choose counter from the I/O types.
- From the I/O Sub Type drop down menu choose the type of Counter.
- Type in the name and Description for this Counter in the appropriate field.

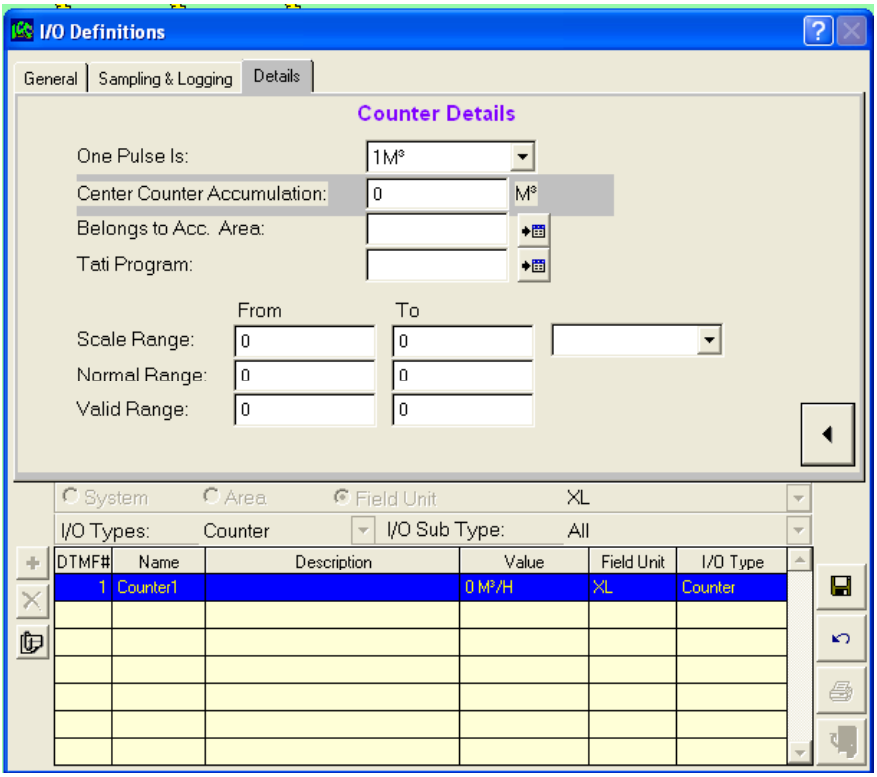
Samples Tab:

The options with in the samples tab are the same for all I/O's please refer to the samples tab for Digital Outputs.



Details Tab:

Click on the arrow for "Counter Details" screen



One pulse is: Choose the scale of measurement, you may choose from English or Metric.

Center Counter Accumulation: You may enter a preset counter value, and the Counter will add the new accumulation to this value.

Belongs to Acc. Area: You may assign this counter to an accumulation Area, by clicking on that table ICON to the right of this field. We will review accumulation, in the "Accumulation"* section of this manual.

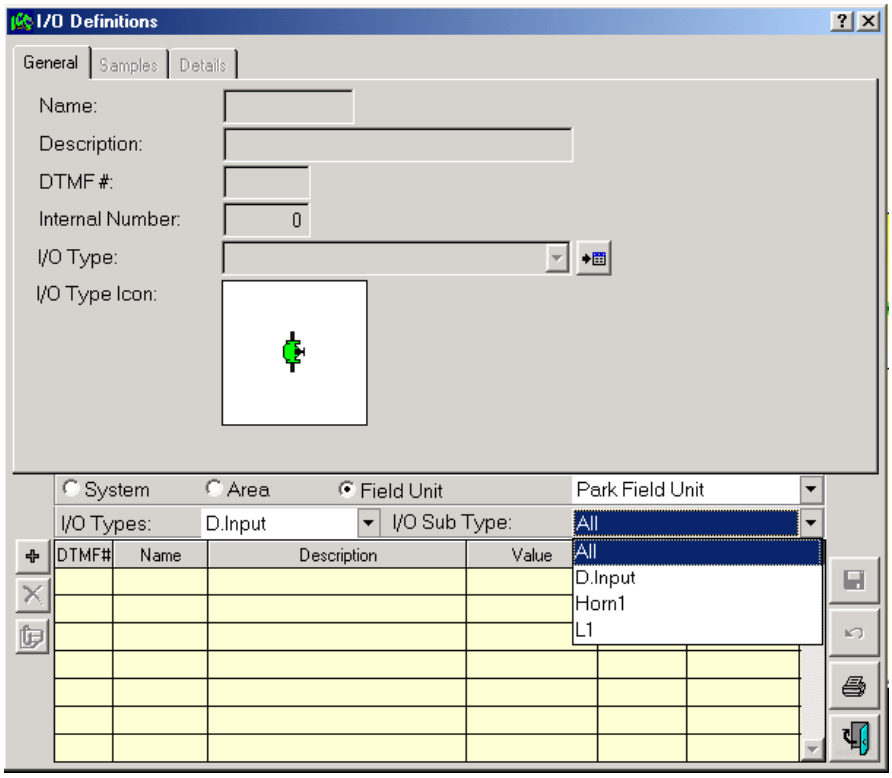
*This feature allows you to group together outputs and main valve accumulated time/quantity values collected from the field units' Cumulative Data table.

Tati Program: You may choose to add this Counter to a TaTi Program. We will review TaTi later in this manual.

Scale Range- Nominal Range- Valid Range: There are times, which you may choose to define the scale of a counter. This information may have been included with the counter you purchased. To do so type in the correct values in each field and from the drop down menu choose the measurement type (GPM, L/H etc.)

Digital Inputs:

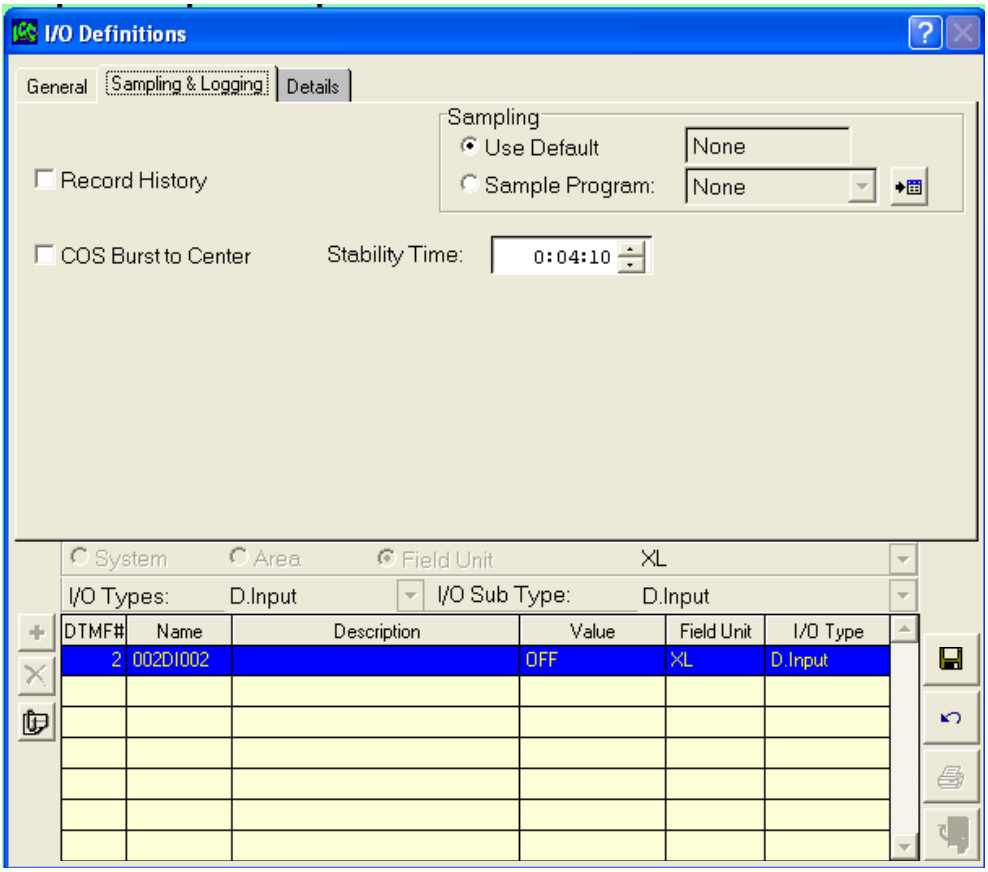
From the System menu choose I/O definitions.



- Choose the field unit you are adding this D. Input to.
- From the "I/O Sub Type" choose the type of Digital Input.
- Click on the "+" to add a new D. Input.
- Type in the Name and Description for the new Input.

Samples Tab:

All the options on this screen are the same as D. Outputs, except for "Change of State and Stability time".

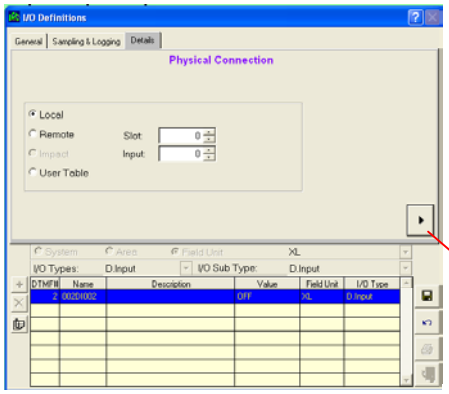


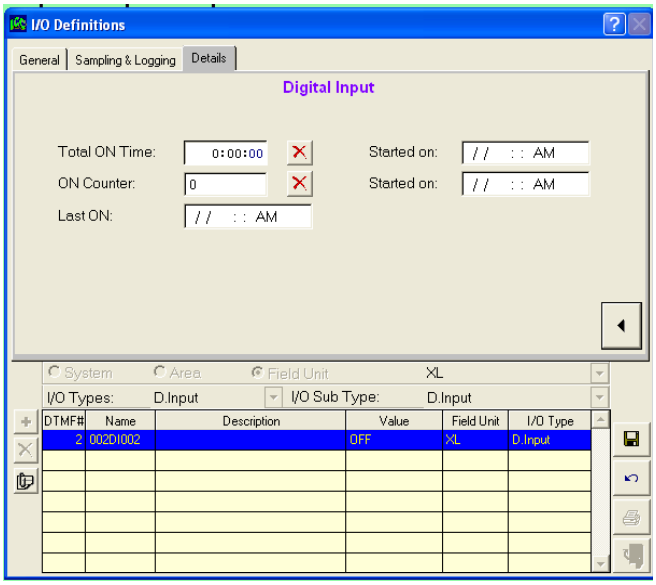
COS Burst to Center: Should you need for this digital input to transmit to the center its "Change of State" check this box.

Stability Time: Time for the Digital Input to be active before sending change of state. This could come in handy with Rain Buckets. If the time is set for 4 minutes, the Input has to be active for 4 minutes before sending change of State.

Details Tab:

The Details tab of Digital Inputs is just as D/O's with a difference that the IMPACT is grayed out. IMPACT's do not poses a D/I. However there are some custom settings for D/I, which you need to define. To define these settings click on the Forward arrow.





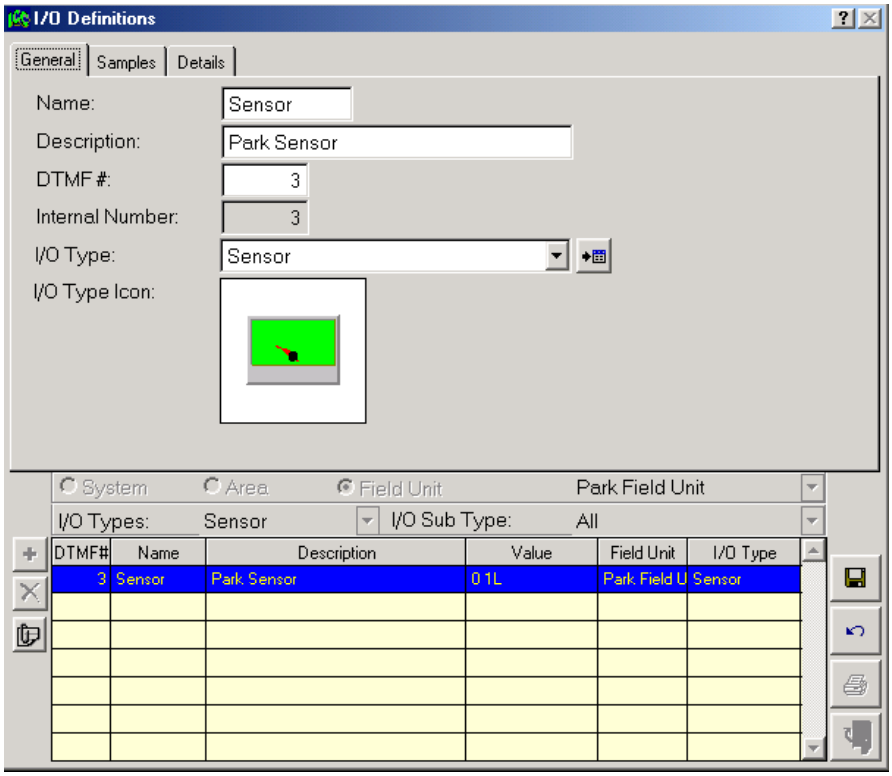
Total On Time: This option displays the total time this input has been active since it's setup. To clear this field click on the X.

ON Counter: This option displays the number of times this Input has been activated. To clear this field click on the X.

Last On: This option displays the Date and Time of the last time this Input was activated.

Sensors:

- From the System menu choose I/O definitions.
- Choose the field unit you are adding this sensor to.



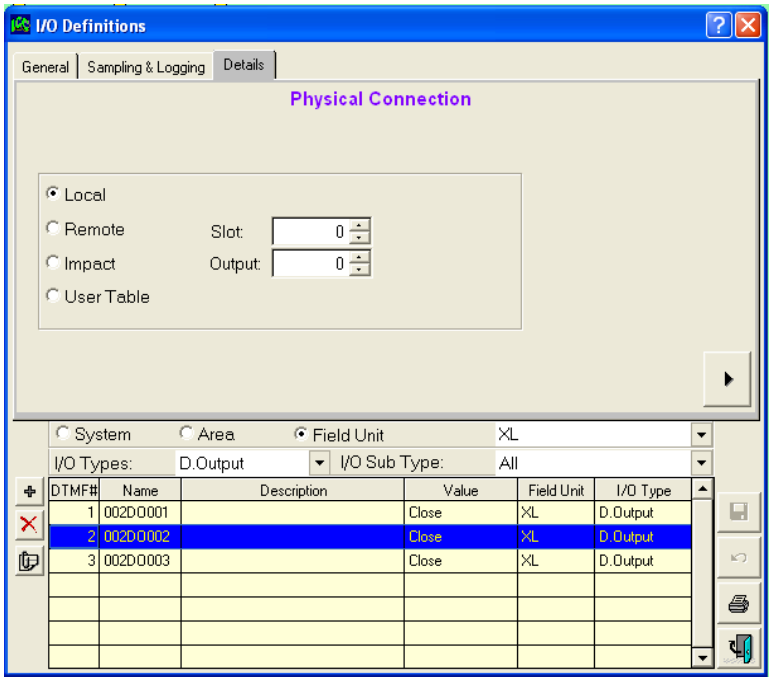
From the "I/O Sub Type" choose the type of Sensor.

Click on the "+" to add a new Sensor.

Type in the Name and Description for the new Sensor.

Samples Tab:

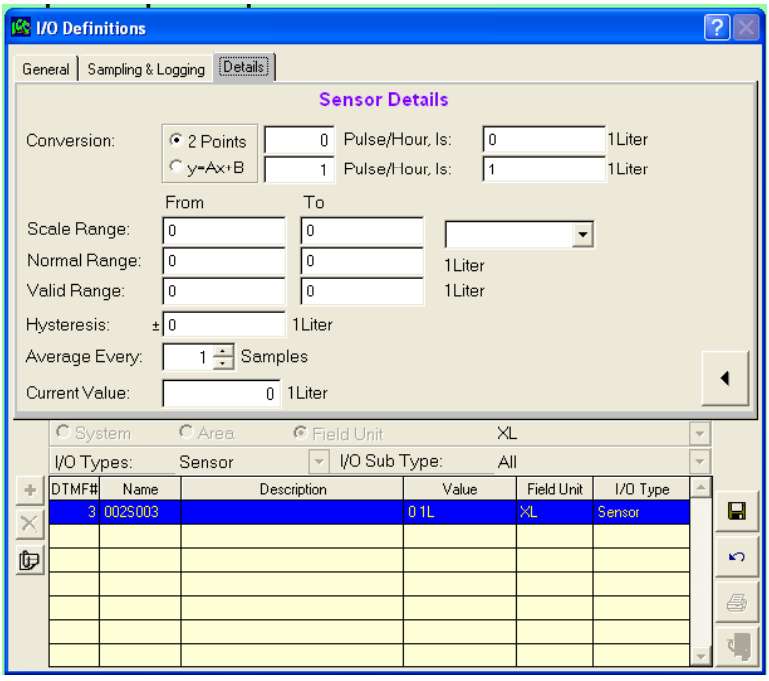
Samples tab is similar to Digital Input.



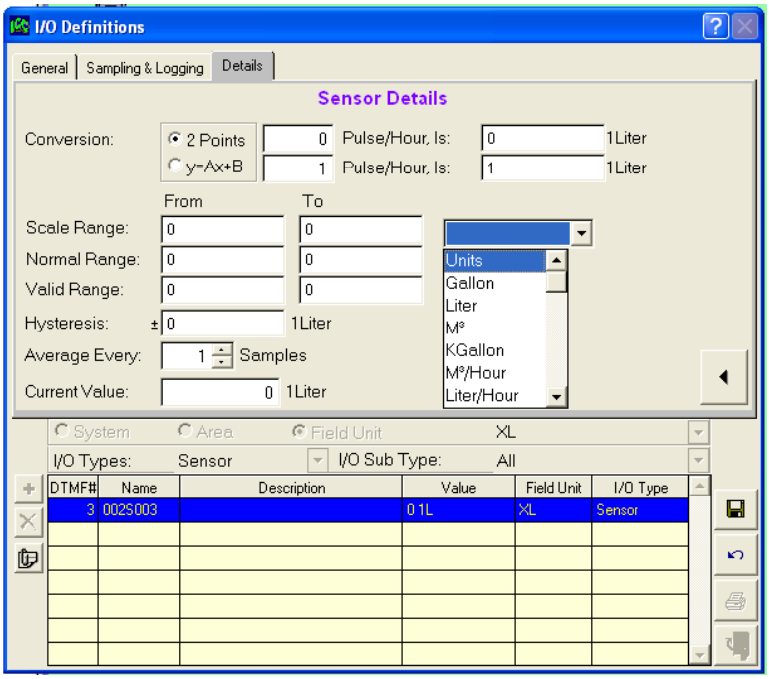
Details Tab:

The "Physical Connection" is the same as all the other I/Os Click on the to move to "Sensor Details" screen.

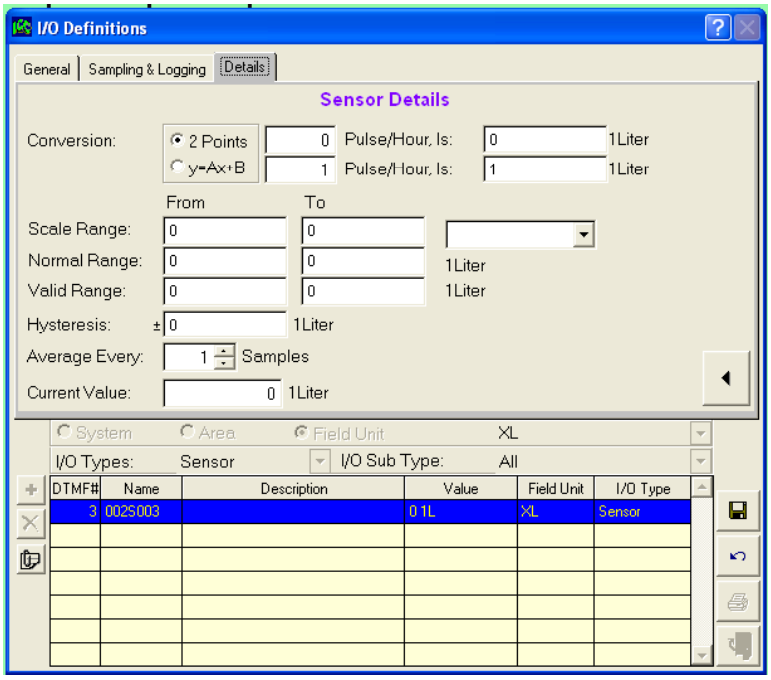
Sensor Details:



From the "Units" menu pick the correct units for this sensor.



Choose the conversion, based on "2 points" or the formula "Y=Ax+B"



2 Points: Based on the type of sensor choose 2 points on the graph to calculate the slope.

Y=Ax+B: Another option is to calculate the slope of the line if you know the values for A and B on the line.

Normal Range: Type in the normal range of this sensor Based on chosen units.

Normal range can be used for Bar Graph later in the user screen, where the bar graph is color coordinated for normal and non-normal ranges.

Hysteresis: A sensor may be lagging, when the forces acting upon it are changed, as if from velocity or internal friction; a temporary resistance to change from a condition previously induced, observed in magnetism, thermoelectricity, etc based on the type of the sensor. Choose the deviation + or -.

Average Every: In the Samples window you chose how often to sample this sensor. Choose how often ICC should Average the samples for this sensor.

Current value: Is a calculate value based on the inputs in the "Conversion" menu and the normal range.

Virtual Counter (Explained):

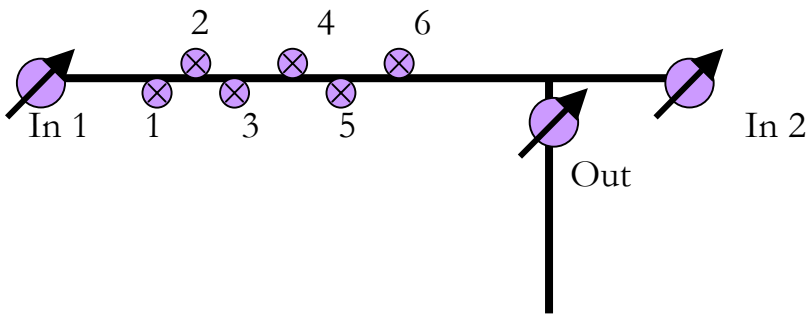
Before we go on, let's take a lesson in Motorola irrigation products and Virtual Counters (meters)

Definition

- Virtual main line is a mathematical function of the IRRInet field unit.
- "IN" flow meters are defined that deliver water into the system
- "OUT" flow meters are defined that subtract water from the system
- The difference (INs - OUTs) is the virtual flow rate

Requirements

- All flow meters should be of the same pulse rate (i.e., 10 gallons/pulse)
- All flow meters must be under the control of one IRRInet (cannot have multiple IRRInets' flow meters)
- If any flow meter is connected to a Scorpio only time-based control of the virtual main is supported.



Valves 1-6 belong to virtual mainline; flow will be determined by adding up 2 In meters and subtracting any flow leaving the system through Out 1 meter.

Now on with the ICC setup:

Virtual Counter (Setup):

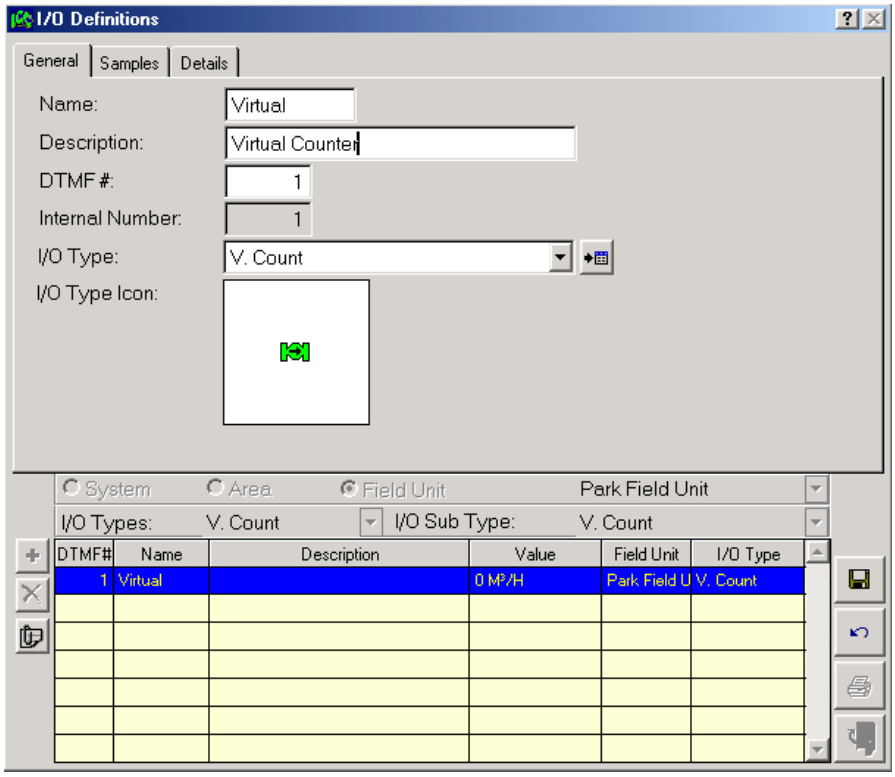
From the System menu choose I/O definitions.

Choose the field unit you are adding this Virtual Counter to.

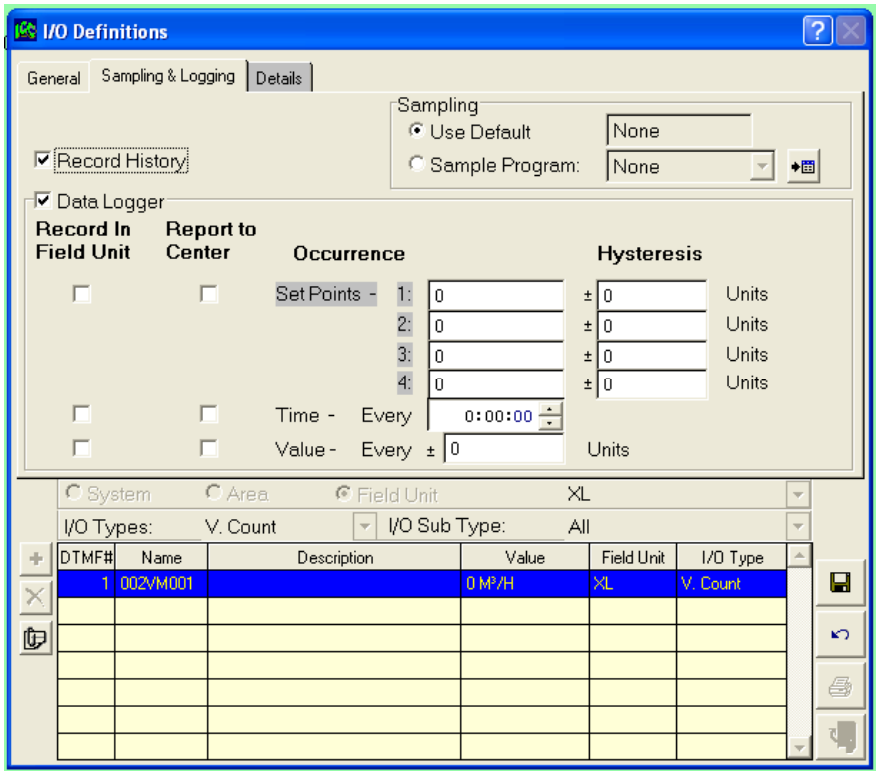
From the "I/O Sub Type" choose the type of Virtual Counter.

Click on the "+" to add a new Virtual Counter.

Type in the Name and Description for the new Virtual Counter



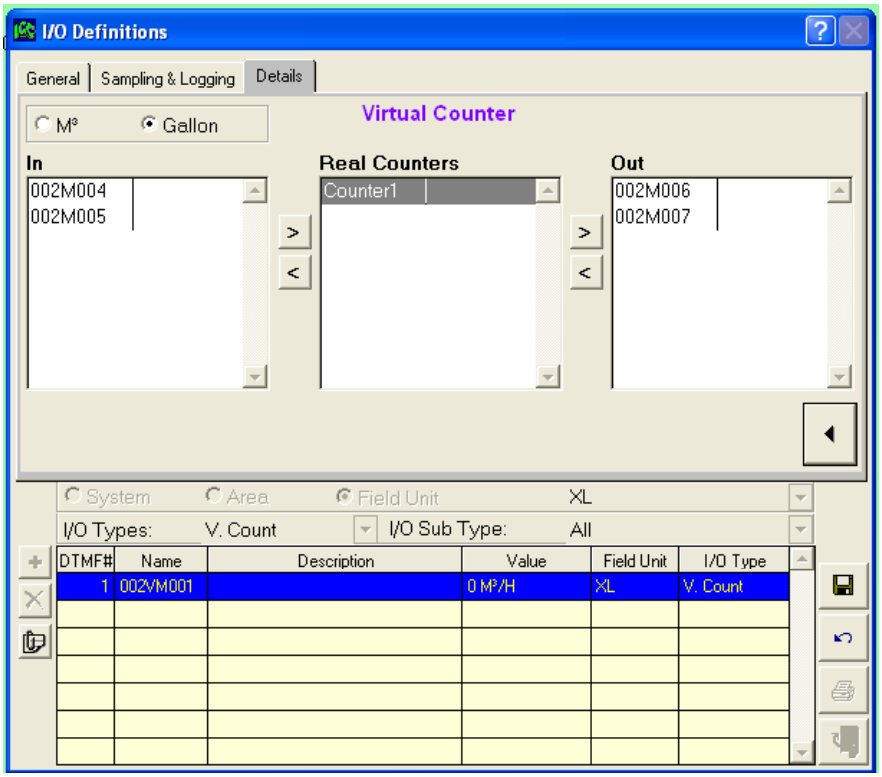
Samples Tab:



With virtual meters on an XL/XM unit you have more choices in sampling and logging of the data collected. Here we have defined a Virtual Meter on an XL RTU and by checking the flag for the ***Data Logger*** we are now able to store data either in the field unit or have it reported to the center.

Details Tab:

In the details tab you will get to choose which counters are IN counters and which are Out counters.

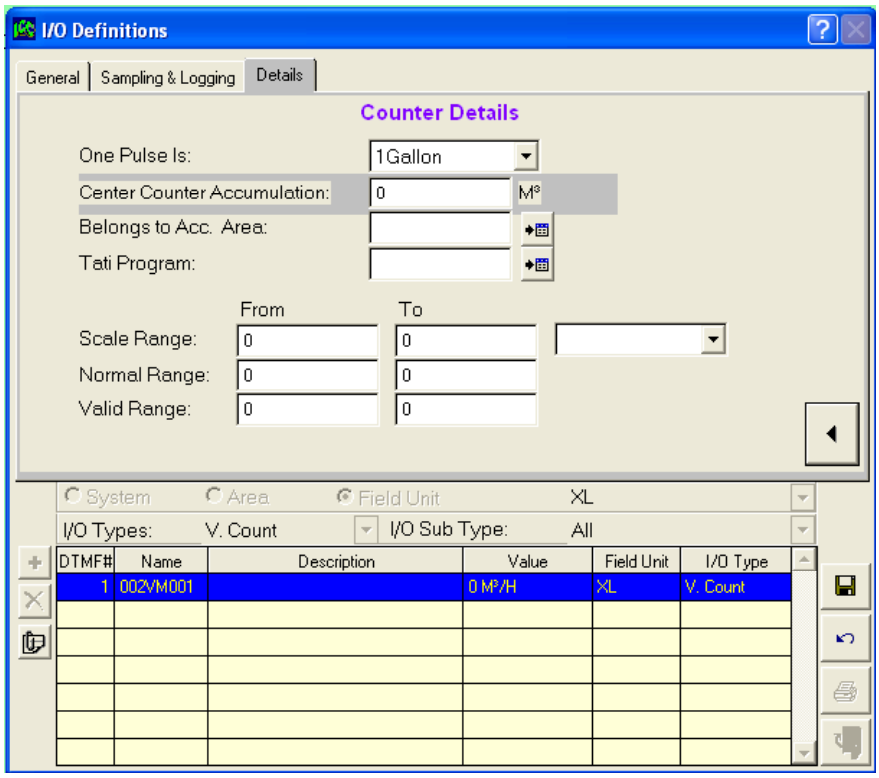


There are 3 columns in this window, the middle column "Real Counters" are the counters that are currently in the stock.

To add a counter to either IN counters or OUT counters, simply click on that counter in the Real Counters column to highlight; then click on the Arrows to either move to or out of the columns. Above we have illustrated as previously reviewed 2 in counters and 1 out counter.

You may choose the units by checking the flag for M^3 or Gallons.

Click on the to see more options.



One pulse is: From the drop down menu choose the volume of each pulse.

Center Counter Accumulation: The true counter value after the addition and subtraction of the other counter would appear here. You may also choose a preset value for the counter. This value could be the amount of water already used and enter it in this field in witch the future values will be added to.

Belongs to Acc. Area: Accumulation will be reviewed in a future section of this manual, the option here is a short cut to add this Virtual Counter value to an accumulation program.

TaTi Program: TaTi will be reviewed in a future section of this manual. Here is a short cut to add this Virtual Counter to a TaTi program.

Scale Range- Nominal Range- Valid Range: There are times, which you may choose to define the scale of a counter. This information may have been included with the counter you purchased. To do so type in the correct values in each field and from the drop down menu choose the measurement type (GPM, L/H etc.)

Dummy; External and Logic Conditions:

Conditions: Are sets of specific parameters used in ICC programming.

Each condition has a specific purpose and the use of the correct condition is extremely important.

In each IRRInet in addition to the number of the valves, there are also options for 64 each, External Condition, Dummy Condition and Logic Condition conditions.

External Condition:

External Conditions are controlled and kept locally in the RTU.

External Condition conditions are used as insert in programs and work as a condition on the program. You may use an External Condition to "Start", "Stop" or put a program in "Wait".

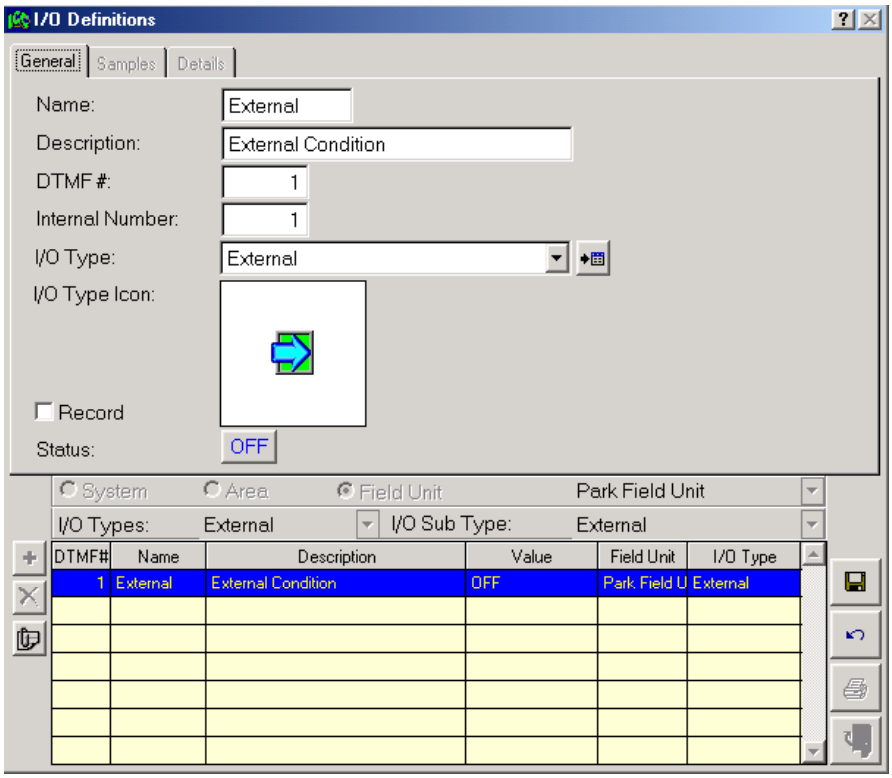
There are 2 different ways of triggering External Conditions.

1. Since External Conditions are controlled locally in your computer you may use a Command to trigger an External Condition(s). For example: If a day or time accrues the Command will trigger the External Condition which in turn affects the program line it's in.

2. Changing the status of the External Condition manually is the second option. By placing the condition in stop, start or wait, all the programs using this condition will be in turn affected.

Now that we have learned the concept let's set up an External Condition step by step…

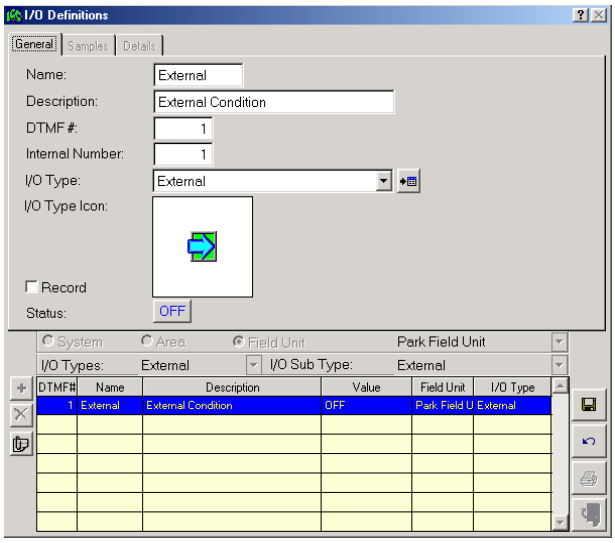
- From the System menu choose I/O definitions.
- Choose the field unit you are adding this External Condition to.
- From the "I/O Sub Type" choose the type of External Condition.
- Click on the "+" to add a new External Condition.
- Type in the Name and Description for the new External Condition



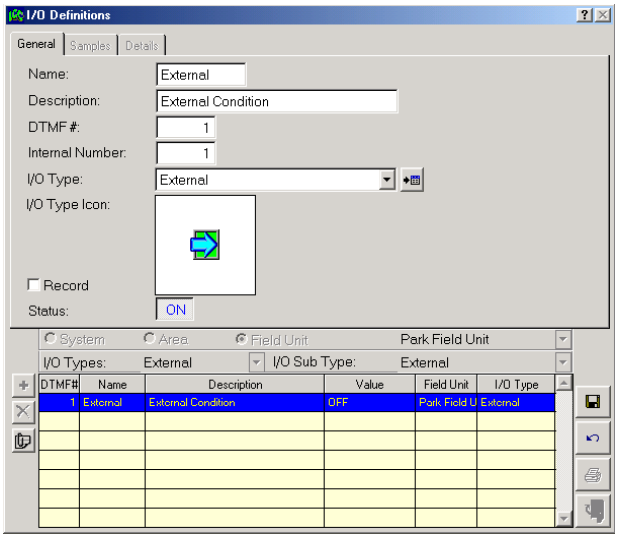
External Condition (Continued):

Record: Check this flag if you would like to record the activity on this I/O to use later in Graph.
Status: As we mentioned before, External conditions are static conditions. The operator chooses the status of this condition in effect manipulating a program status that depends on this condition. The status is a button by clicking on the button the operator can change the status from "OFF" to "ON" and vise versa.

OFF STATUS



ON STATUS

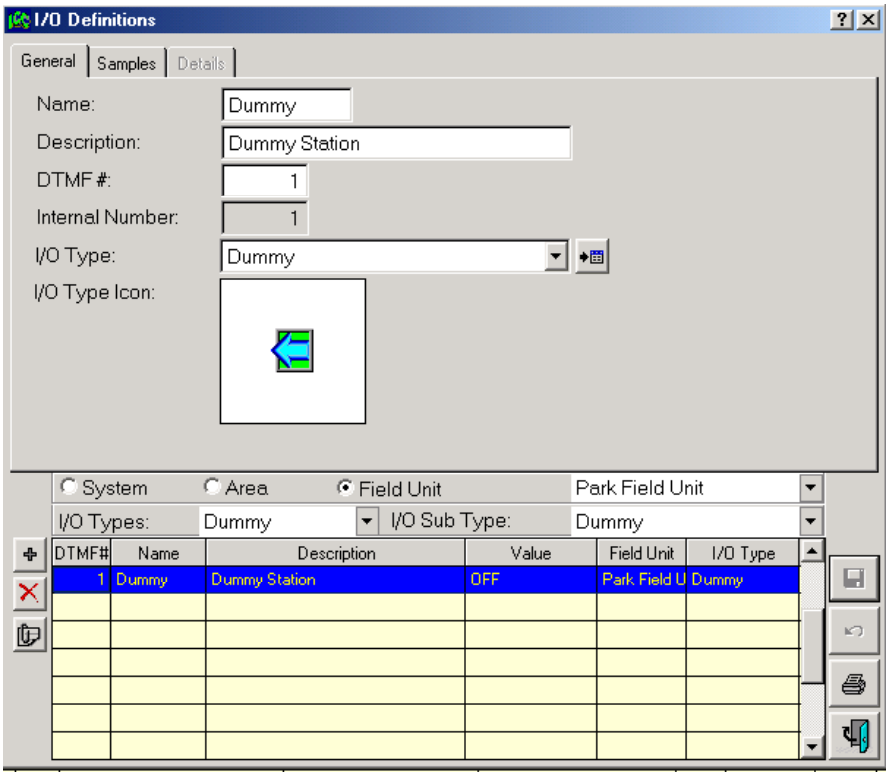


Dummy Condition:

Dummy Conditions are the most useful of all 3 conditions. Dummy Conditions are sent to the field units just like a normal valve and are used in the programming the same as any other valve. The operator will be able change a program by manipulating the Dummy condition.

This let's create a Dummy Condition.

- From the System menu choose I/O definitions.
- Choose the field unit you are adding this Dummy Condition to.
- From the "I/O Sub Type" choose the type of Dummy Condition.
- Click on the "+" to add a new Dummy Condition.
- Type in the Name and Description for the new Dummy Condition.



As you can see just like any other Valve you may click on the "Samples" tab and choose how often you may want to sample this "Dummy Valve".

However unlike a real valve, Dummy Condition does not have a physical connection, so the details tab is grayed out.

Unlike External Condition conditions there is only one way of triggering a Dummy Condition.

- **Using a program line.** When using a program the possibilities are enormous. You may set a program line to stop, start or wait if a Dummy Condition is on. Then use that Dummy Condition as a valve in another program line. This will keep the Dummy Condition active until the program has finished running.

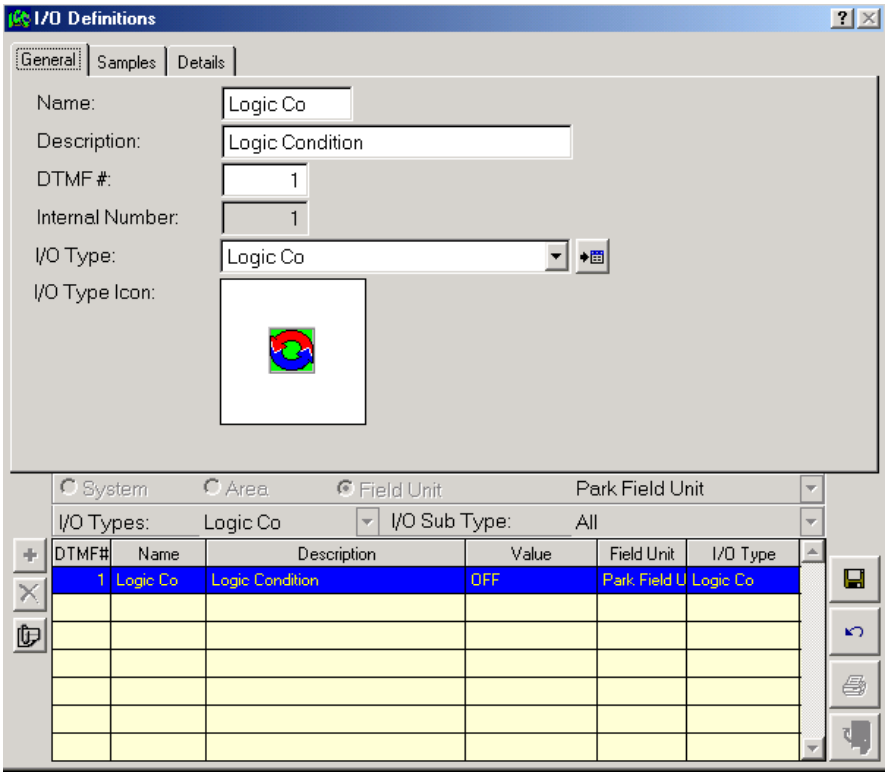
Logic Condition:

Logic Conditions are just like commands but with fewer options.

These conditions can only be written at the center using the ICC software; however they are downloaded to the RTUs.

The best way to review logic condition is to set one up so let's start.

- From the System menu choose I/O definitions.
- Choose the field unit you are adding this Dummy Condition to.
- From the "I/O Sub Type" choose the type of Dummy Condition.
- Click on the "+" to add a new Dummy Condition.
- Type in the Name and Description for the new Dummy Condition.

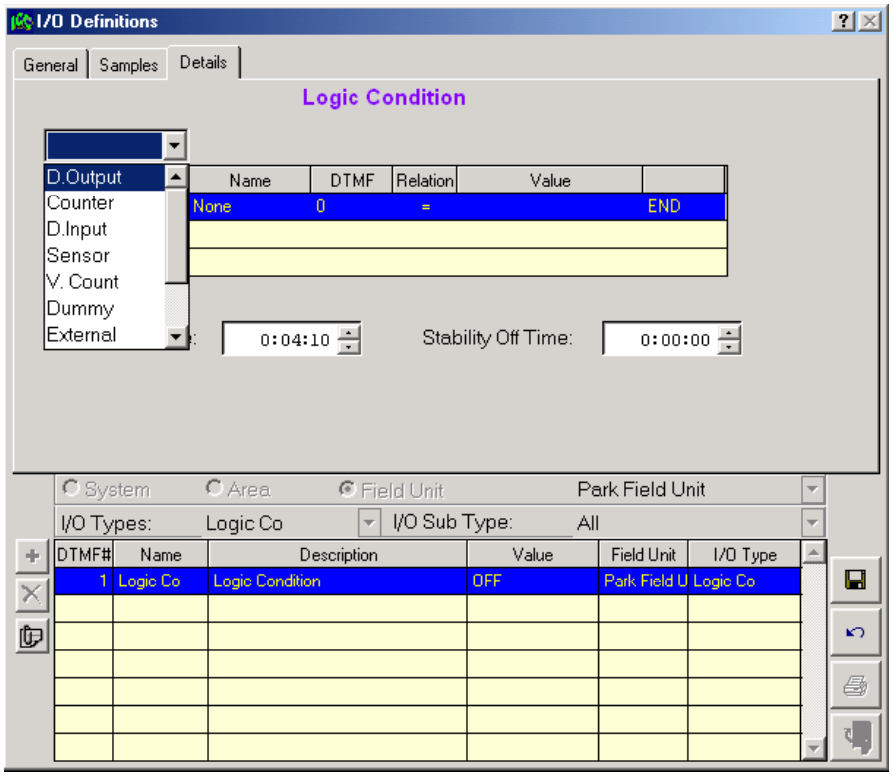


Samples Tab:

Samples screen is just like all other I/O types.

Details Tab:

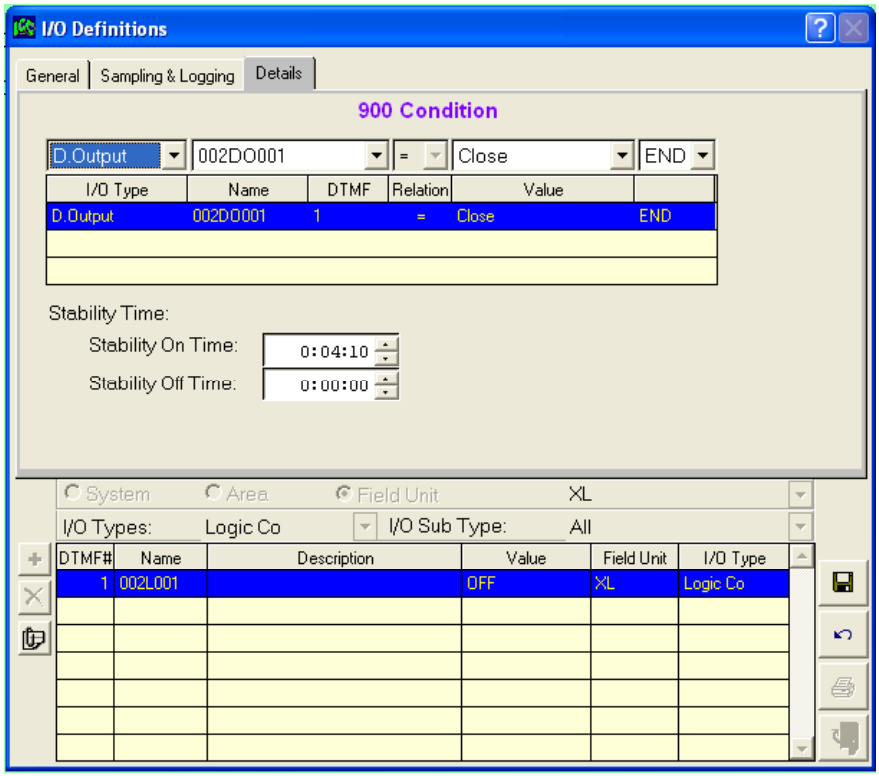
From the drop down menu choose the I/O, which is going to be affected by this



Here there are many different options; this window is almost similar to that of the Commands screen, where you would choose type of I/O and assign the relevant conditions.

For this Logic Conditions to affect an output; from the pull down menu choose D. Output.

- More options will appear; on the next page we will review some of these options.
- From the list of Outputs choose the one, which will be effected with this logic condition.
- Choose the outputs condition i.e. open or close.
- You may use multiple conditions by choosing "Or" form the last menu. Otherwise choose end.



Stability on Time: This is the time to wait before starting the logic condition.

Stability off Time: When this time is set the logic condition will not go off after it's component is no longer met, till this time is over.

For example: If this time is set to: 04:10 then the start of the Logic Condition will be delayed for 4 minutes and 10 seconds. The same will apply when the condition is no longer met; the Logic Condition will not stop for 4 minutes and 10 seconds.

The following is the table of the I/O's and the available options for them.

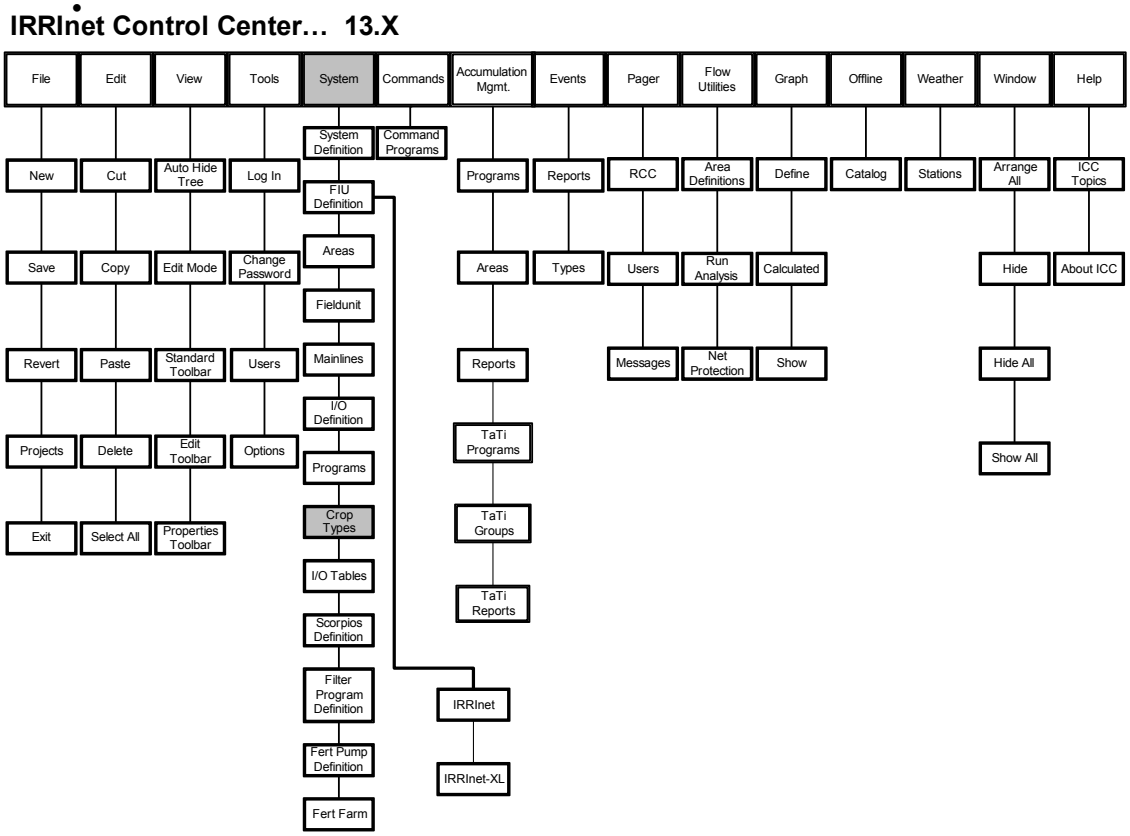
I/O	**OPTIONS**
Valve	Open, Close
Meter	< , >=
Input	On, Off
Sensor	< , >=
Virtual (Virtual Meter)	< , >=
Dummy Condition	Open, Close
External Condition	On, Off
Logic Condition	On, Off

Crop Types:

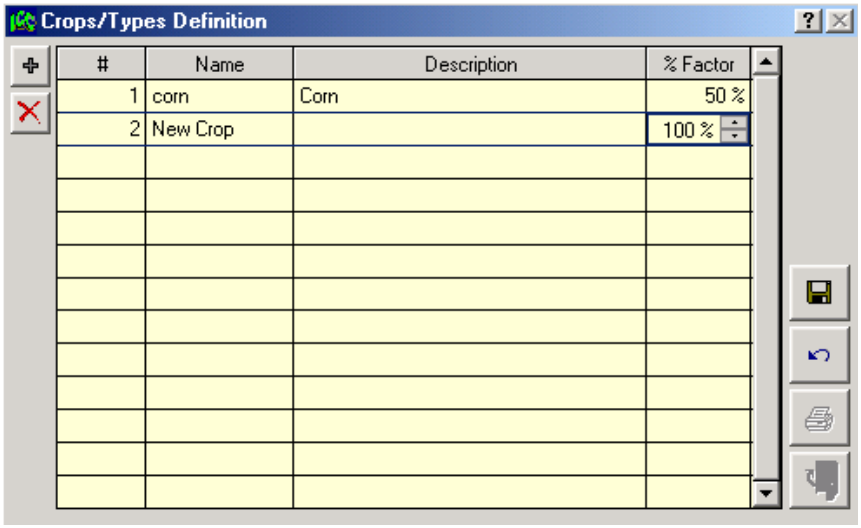
As we mentioned earlier in this manual there many different ways in ICC to set water factors. One of which is to change water factor by crop type. Crop types can then be chosen when creating a main line therefore before continuing with mainlines we are going to cover this option.

From the menu click on the "System"

Choose "Crop types" from the drop down menu.



Click on the "+" sign to add a new crop and type in the name of this crop in the



Name field. To add a description simply clicks in the description field and type in up to 48 characters.

"% Factor": Can be changed by either using the up and down arrows or typing in the actual factor using the keyboard.

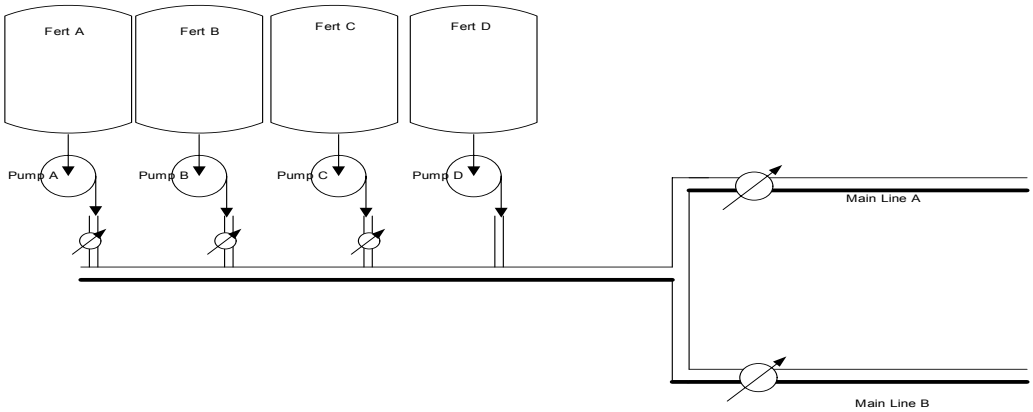
When done adding the entire different "Crops" click on the Save button and exit.

Fert Pump and Fert Farm Explained:

In the ICC Fert pumps are independent of mainlines; and can be defined separate to program. Before we start going through the setup and programming of fertilizer pumps, lets consider a system designed with 2 mainlines and four Fert pumps.

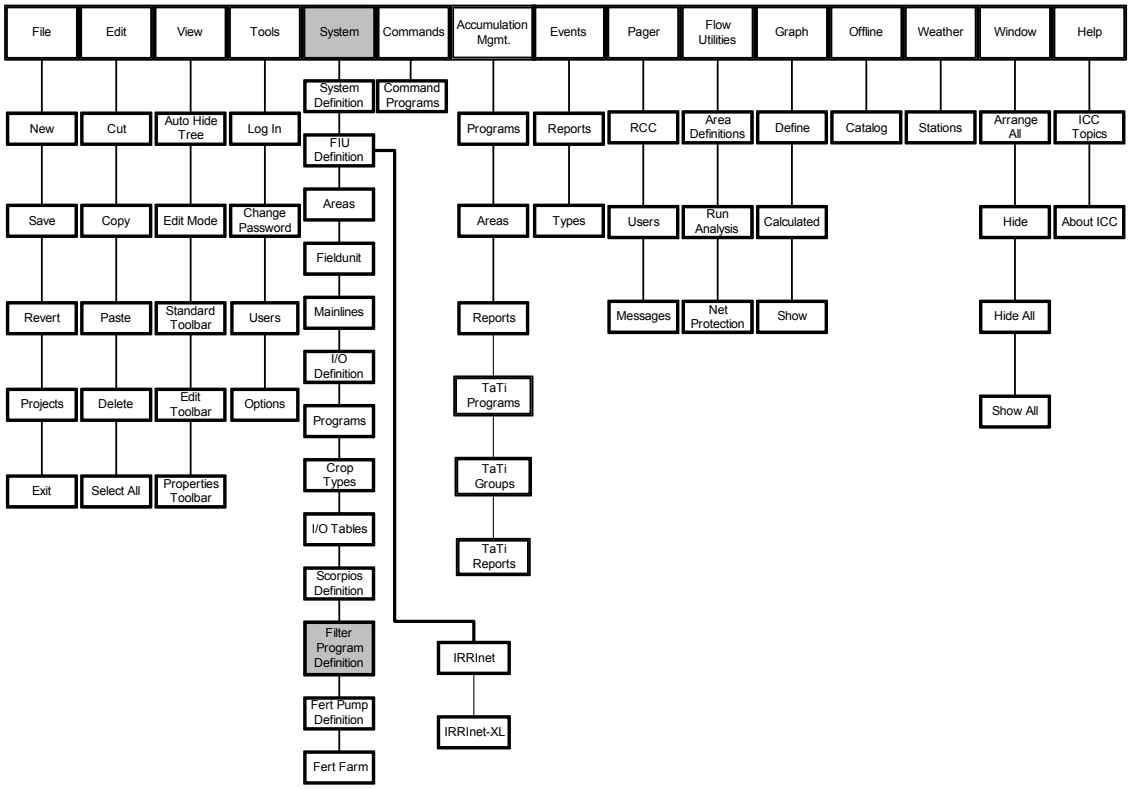
Brief Description of this system:

The system will have 4 Fert tanks A-D. Tank A, B and C have meters therefore we use them in our irrigation system by volume. Tank D does not have a meter and will be fertilizing by time.

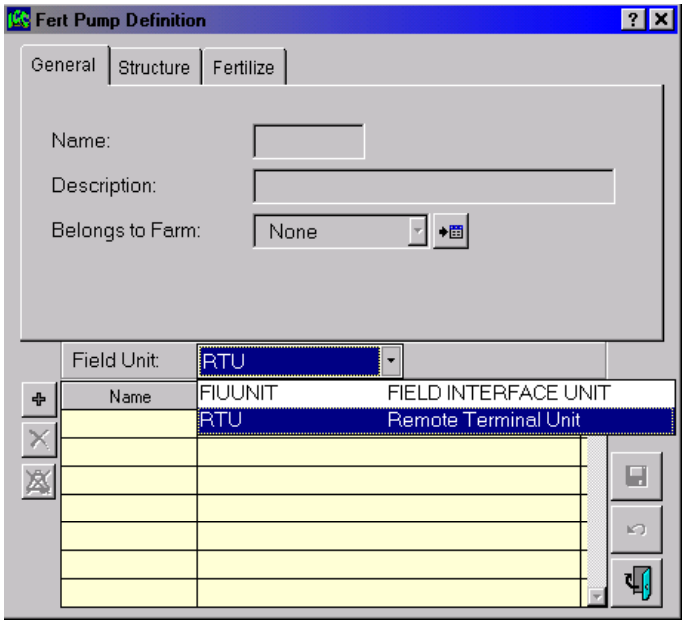


Let's start by defining the "Fert Pumps" on this system. Click on the "System" icon in the menu and choose "Fert Pump Definition".

IRRInet Control Center… 13.X

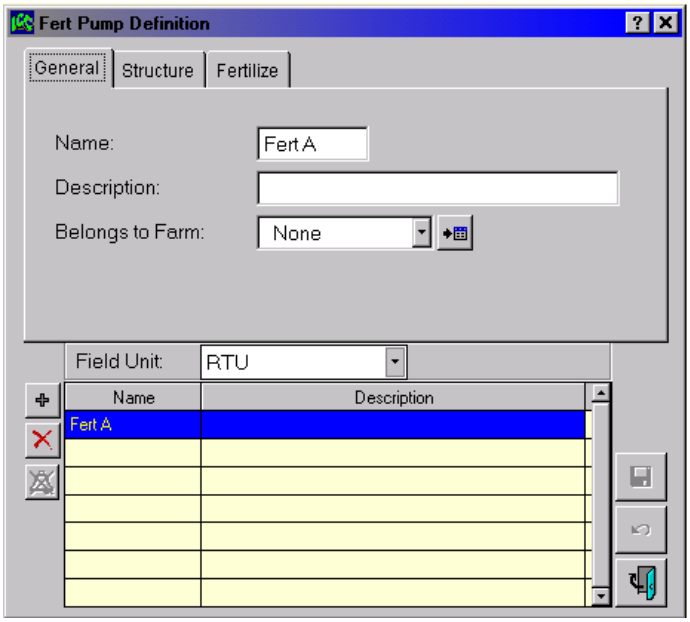


In the Fert Pump window first we need to choose the Field Unit, which these Fert pumps are going to be physically connected to and communicate with. Choose the Field Unit by clicking on the drop down menu of the "Field unit".



After choosing the Field Unit, define 3 Fert pump connected to Fert tanks A-C.

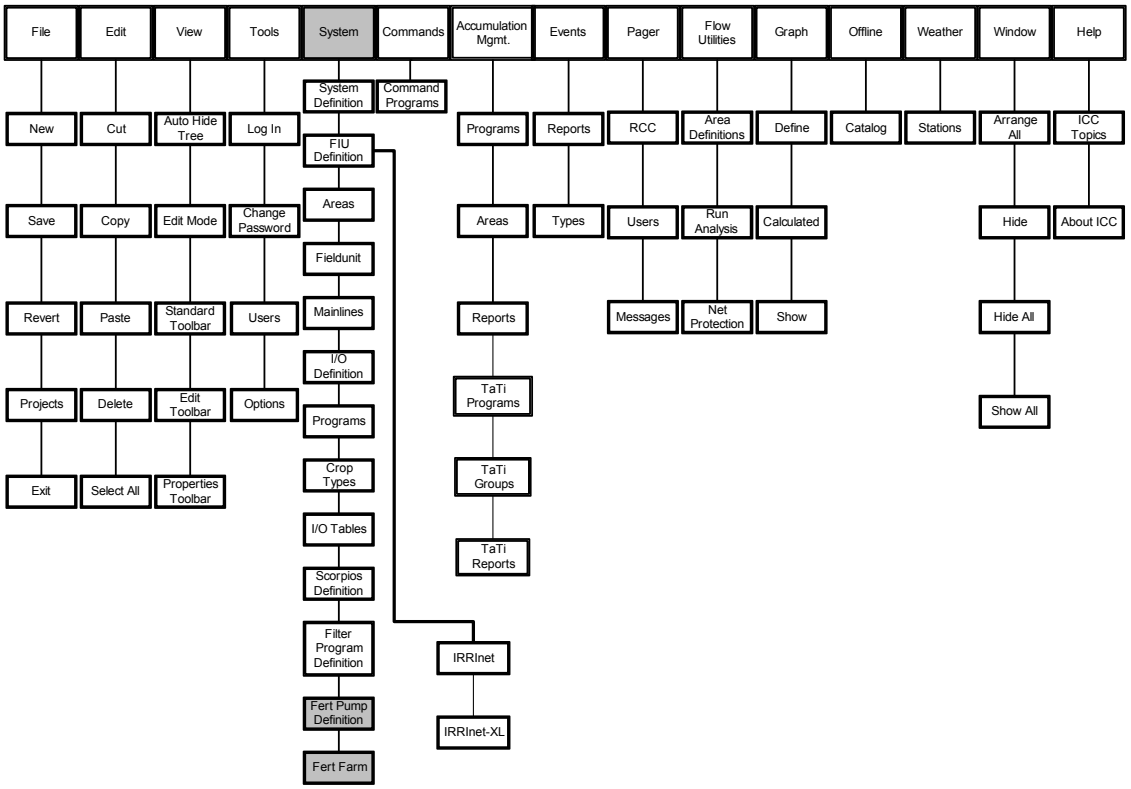
Click on the "+" and type the first pump in the "Name" field. You may also type in a "Description" if you wish.



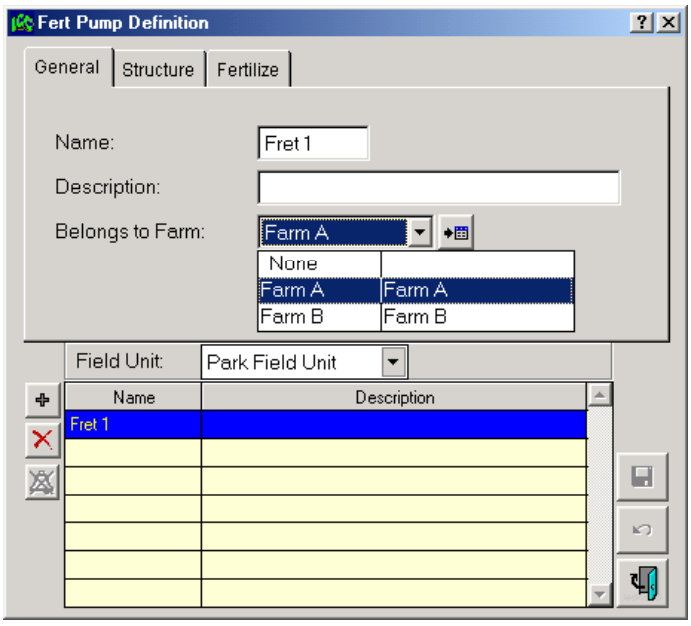
To add this "Fert Pump" to a "Fert Farm"; you may click on the table icon to the right of "Belongs to Farm" drop down menu. The window for "Fert Farm" will open. You may also go this window by clicking on the "system" from the menu and click on the Fert Farm.

The "Fert Farm" window will open.

IRRInet Control Center… 13.X



Fert Farm:



From the "Field Unit" pull down menu, choose the RTU you want to add the farm to.

Click on "+" to add a Farm.

Type in the "Name" and the "Description" of the new farm.

Click on the Save button and exit.

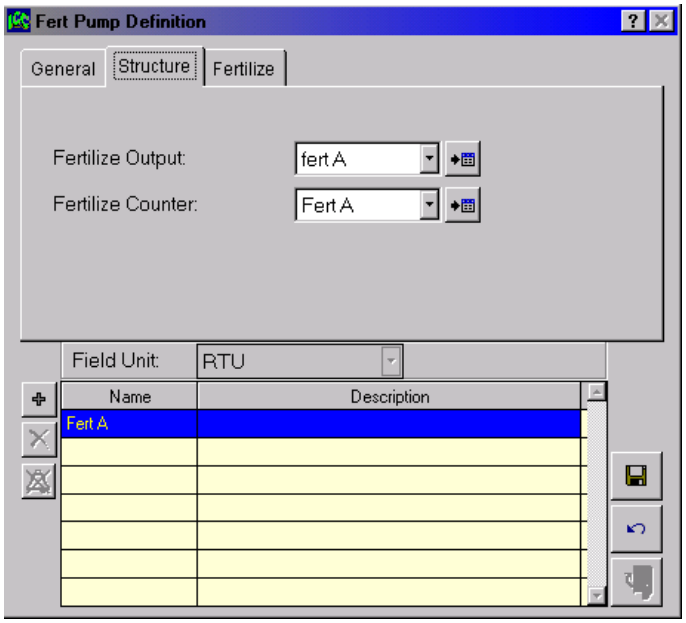
Fert Pump Definition (continued):

From the Belongs to Farm drop down menu choose the Farm, which this Fret Pump belongs too. If this is a stand alone Fert Pump, chose "None".

Structure Tab:

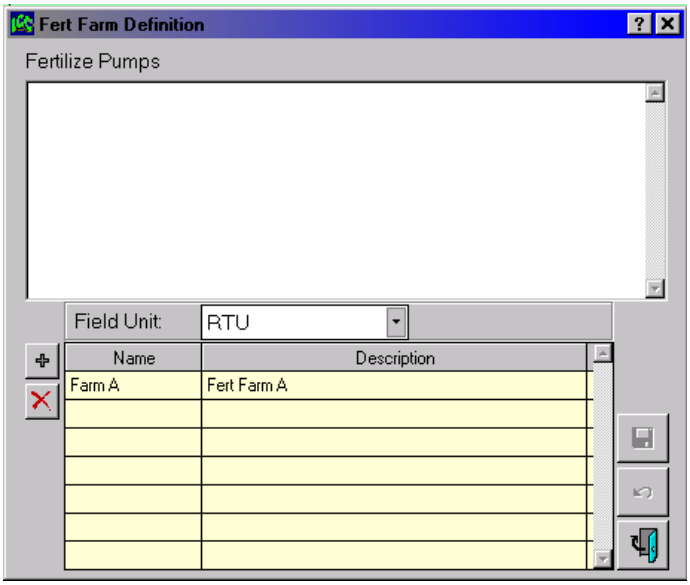
Click on the "Structure Tab" to define the output for the Fert pump and the meter connected to this pump, if any. (As per our structure above Tank A-C have meters and tank D doesn't). If you have not yet defined these Outputs and Counters click on the tables (either by output or counter) to add them.

Fertilizers may belong to a farm (A group of fertilizers) this would help in programming of ICC, when the operator needs to open a set of fertilizers he may choose the whole set by choosing a Fert farm, rather than each Fert Pump. The fertilizers of course can be picked at any time individually.



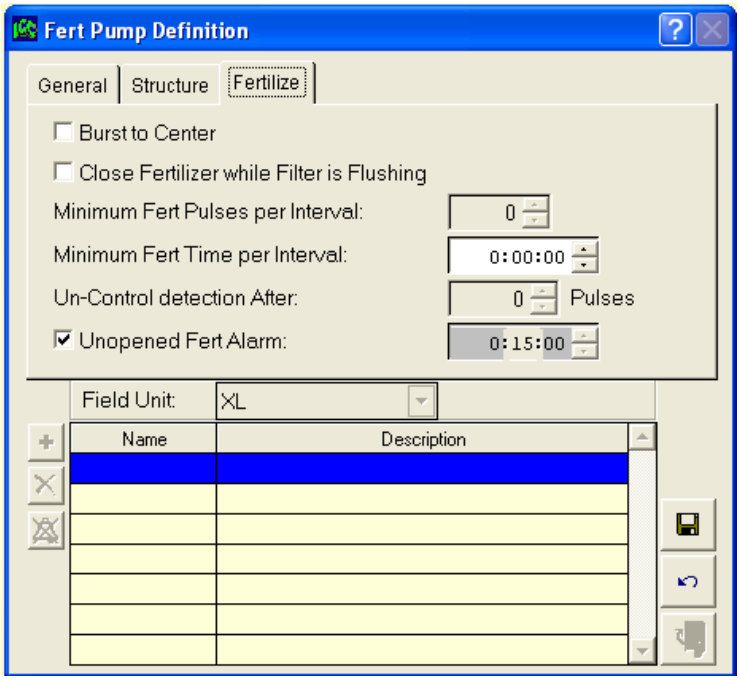
***Note: When adding your Fert Counter don't forget to define the amount of Fert per pulse.

Click on the "Fertilize" tab to continue.



In the "Fertilize" window you will have to choose

Fertilizer Tab:



"Burst to Center": This option will force the RTU to send a burst of any change in the status of this pump, to the center as an event. For example; if a program is set to turn on this pump while irrigating, the change will be sent to the center as a pop up event.

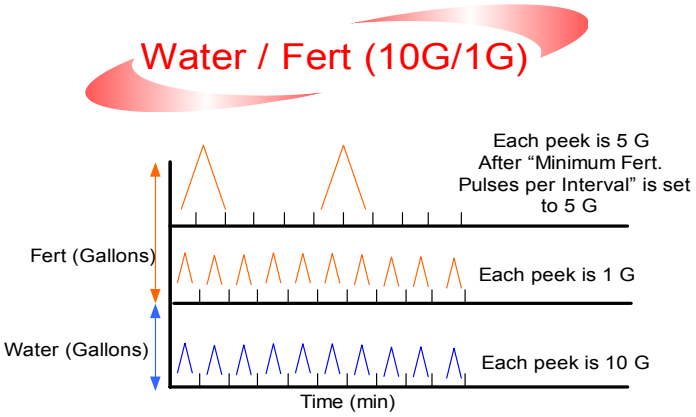
"Close Fertilizer while Filter Flushing": If this option is checked the fertilizer pump will stop when the filter needs to be flushed. However if this pump is part of an irrigation program the program will continue with out the fertilizer. Till the flushing is complete.

***Note: You may set the DP for the flushing of the filter in the "Filter Program Definition" window under the parameters tab.

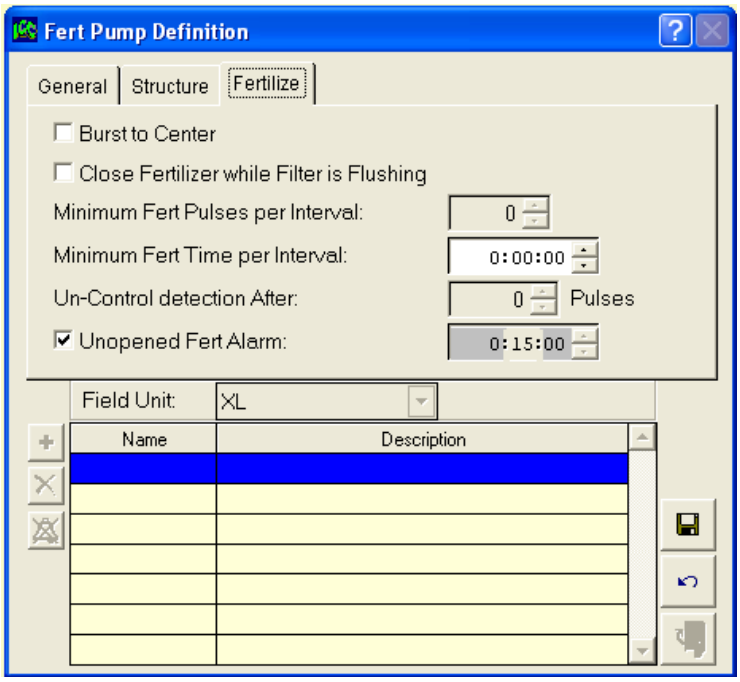
Minimum Fert Pulse per Interval: If you have set your fertilizing options in the irrigation program to "Proportional" it is critical sometimes to pay attention to the ratio of the fertilizer to water. For example consider the following.

An irrigation program is set to water 100 G in 10 Minutes, during which add 10 G of Fertilizer in proportional to the water (This is an option in fertilizer programs). The details will be

10 G Water mixed with 1 G Fert per minutes, for 10 minutes. This program is logically a good program however practically you may not want the Fert pump to start and stop every minute. This will destroy the pump and Fert valves which are very expensive. ICC allows the user to set a minimum of pulses for each interval of the pump. You may set the Minimum to 5 pulses. Using our example



the pump will turn on for 5 pulses of the meter, and then wait for 50 gallons of the water to go through and turn on again.



"Minimum Fert Time per Interval": This option is just as option 3 but based on time rather than Volume. This time defies the minimum time that the Fert pump can be open at any time, there by protecting the Fert pump and valves from opening and closing too often.

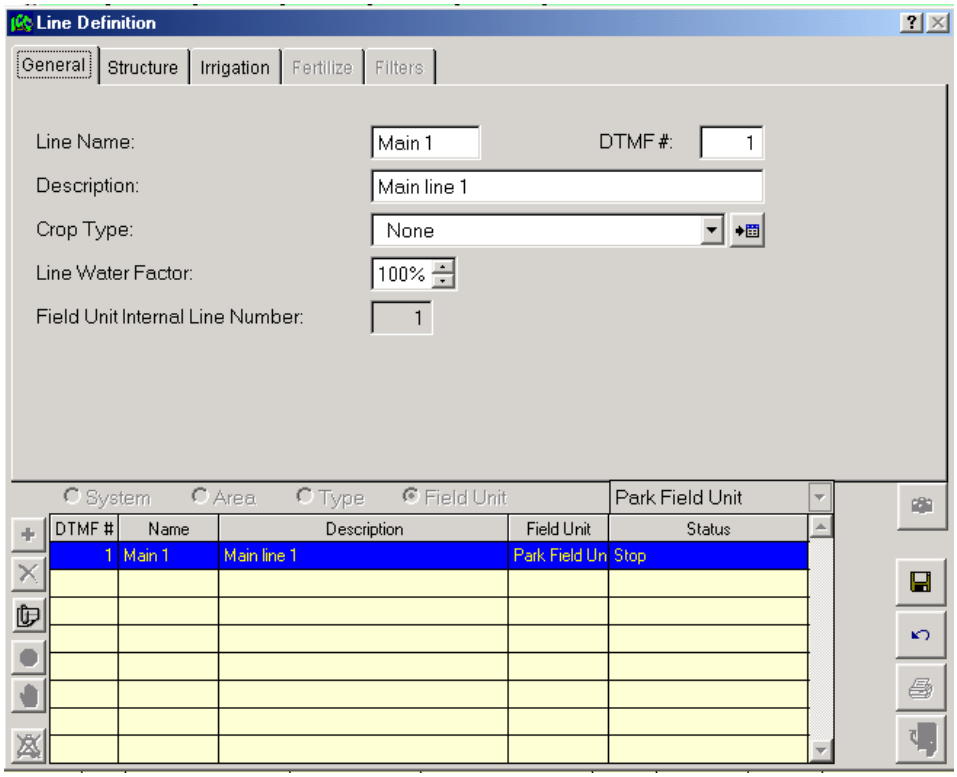
"Un-Control detection After:" This option is to alarm incase there is a leak in the fertilizer. For example we have chosen for system to alert if there are 3 pulses without system asking for this fertilizer. The pulses do not have to be consecutive, if first pulse is at 08:00 and the second at 15:00 and third at 15:15 even though the pulses are from 7 hours to 15 minutes a part, it is still considered 3 pulses. The system will reset this number after the next irrigation program.

"Unopen Fert Alarm": Here the operator gets to choose how long the system should wait before alerting the center that there are no pulses on the Fert counter, after the irrigation program has started.

**** Note: It is important to note that this alarm will not stop the irrigation, if the operator has chosen to irrigate just for the purpose of fertilizing, the system will continue watering.

Main line continued:

Now that we have created all possible elements of a main line (output, input, sensor, Fert etc) let us created a main line that has all these elements included.



When this button is green you may click on it to start the line. A message will pop up asking

"Do you want to gather counters and irrigation program status before reset"? Choose "yes", "No" or "Cancel".

Use this button to put the line into stop

Click on this button if you like to reset an alarm on this line.

Let us create a main line.

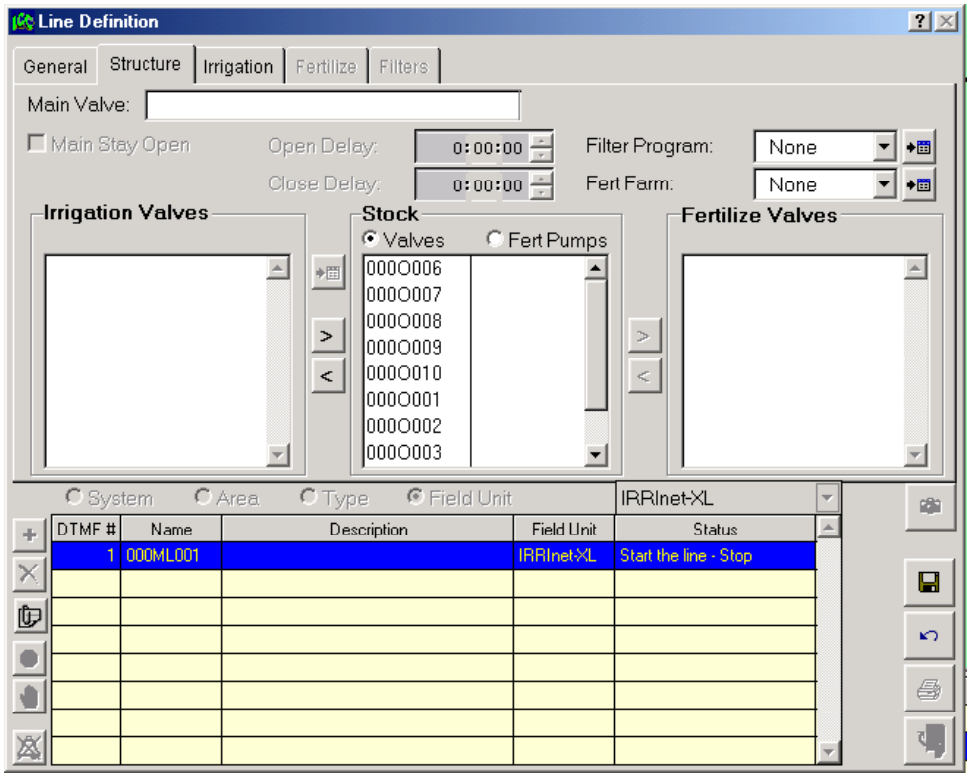
Choosing the field unit for the main line: Check the flag by the field unit and from the drop down menu choose the field unit, which you are adding this main line to.

Add new main line: Click on the "+"sign to add a new main line.

Name and Description: Type in the "Name" and the "Description" of this line.

Crop Type: If the line is supporting a "Crop Type" with a different WF than the rest of the lines on this RTU choose this crop type from the drop down menu or create a new one by clicking on the table icon.

Mainline Structure tab:



There are 3 tables in this window, on a quick glance you will see the main valve field is empty and so are the tables "Irrigation Valves" and "Fertilizer Valves". The list of all the "Free Valves" (valves that are currently not attached to any mainlines) appear in the "Stock table"

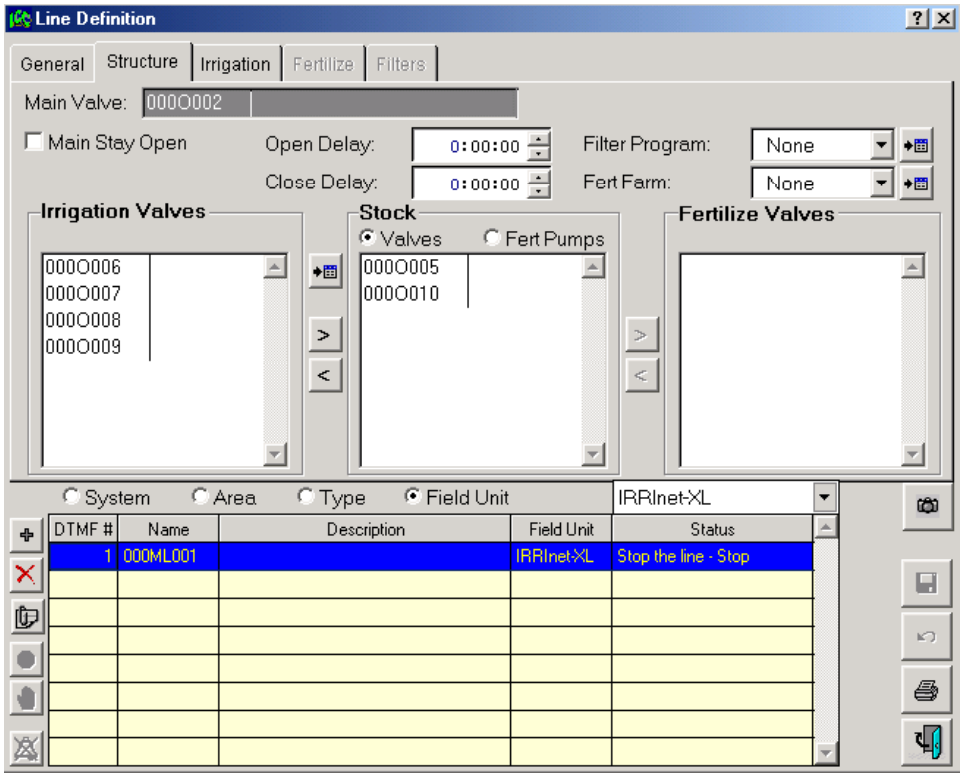
There are couple different ways of adding valves from the Stock to the Irrigation Valves. You may "drag and drop": a valve (by clicking on the select valve in the stock table, holding the left mouse button and dragging it to the Irrigation Table) or using the arrow keys.

To use the arrow keys"

- Click on the valve you are interested in choosing for this line to highlight the valve.
- Using the left arrow move the valve over to the Irrigation Valves table.

Choosing a "Main Valve" for a "Main Line":

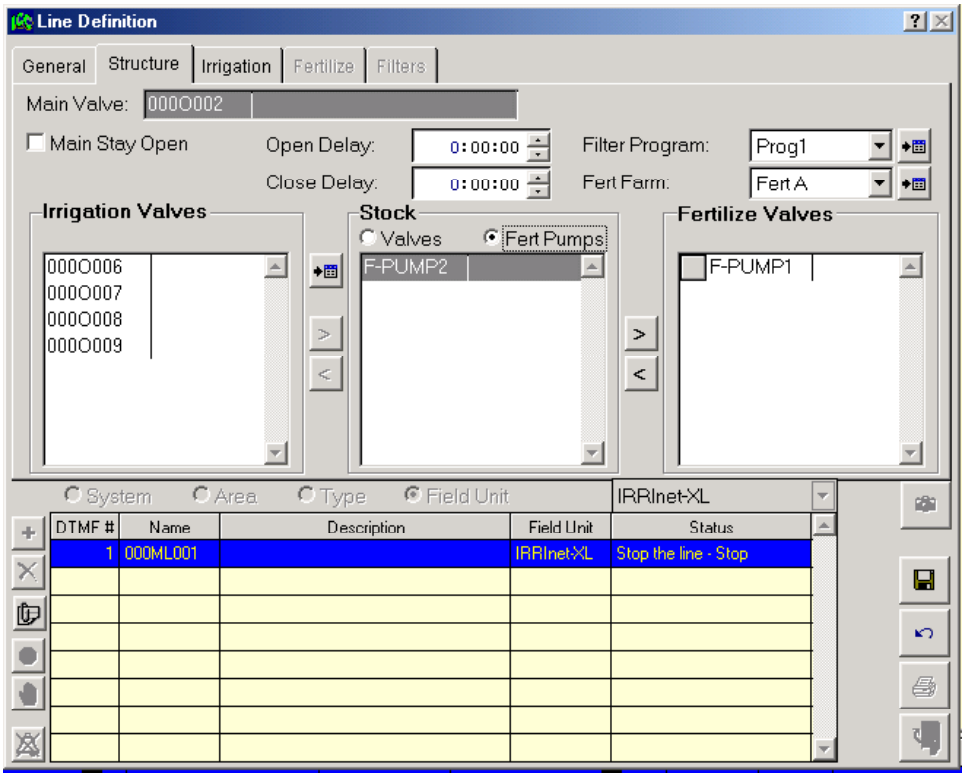
From the "Stock" choose the output, which is going to be your "Main Valve" using the mouse left click on the valve and drag it to the Main Valve box.



Choosing a fertilizer valve for the main line:

Check the flag for the "Fert Pump".

A list of the available pumps becomes apparent in the Stock use the right arrow key to move the pump from the Stock to Fertilize Valves.



Filter program: From the drop down menu choose a "Filter Program" if you don't have a filter program written for the chosen filters you may click on the table on the right of this option to open the filter program window.

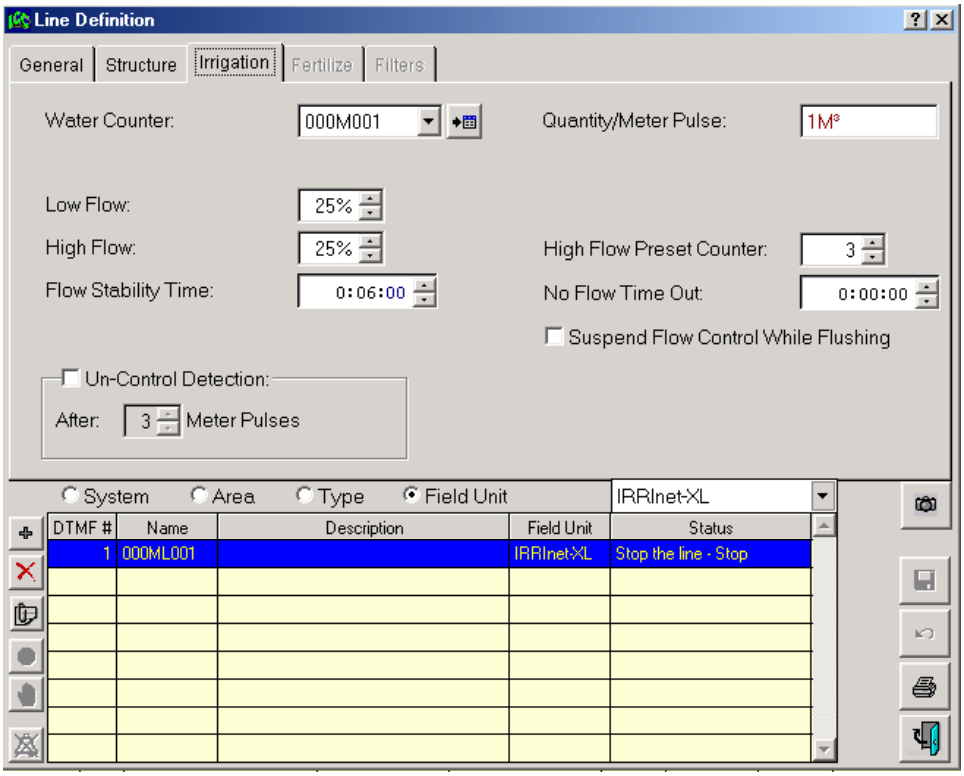
- **Fert Farm:** From The Drop down menu choose the Fert farm (if any) that belongs to this line.

- **Open Delay:** The operator may set a line open delay, by inserting a time here.

- **Close Delay:** The Operator may set a line Close Delay by inserting a time here.

- **Main Stay Open:** Sometimes it is necessary to keep a main line open at all time to keep the line pressurized, if this is a case for this main line check the flag by this option.

Irrigation Tab:



There are many options in this window that we need to keep special attention to. In this window you will get to choose the water meter on the line and specific information about this line, which would help in smooth operation of the line.

There are many options in this window that we need to keep special attention to. In this window you will get to choose the water meter on the line and specific information about this line, which would help in smooth operation of the line.

Water Counter: From this drop down list choose the water counter you have created for this line. Notices the table icon to the right of this option, by clicking on this table add a new counter window will open.

Quantity / Meter Pulse: This option is not changeable; it is a reference to the Quantity, which was chosen for this water counter earlier. If the information is not correct, click on the table to the right of the water counter and edit the counter settings.

Low Flow and High Flow: Choose the percent deviation of the flow on this line. Sometimes it is normal for the pressure on the main line to fluctuate. ICC will popup an event incase of pressure change of either "Low Flow" or "High Flow", it is a good practice to choose a percent deviation that is safe and normal for this line.

Flow Stability Time: Same as Pipe Fill Up time. Type in the length of time it takes for the flow to stabilize in this line during this time high flow and low flow alarms will not register.

Un-control Detection: Check this flag and set the number of pulses for uncontrolled water. Depending to the main valve volume you may want to set

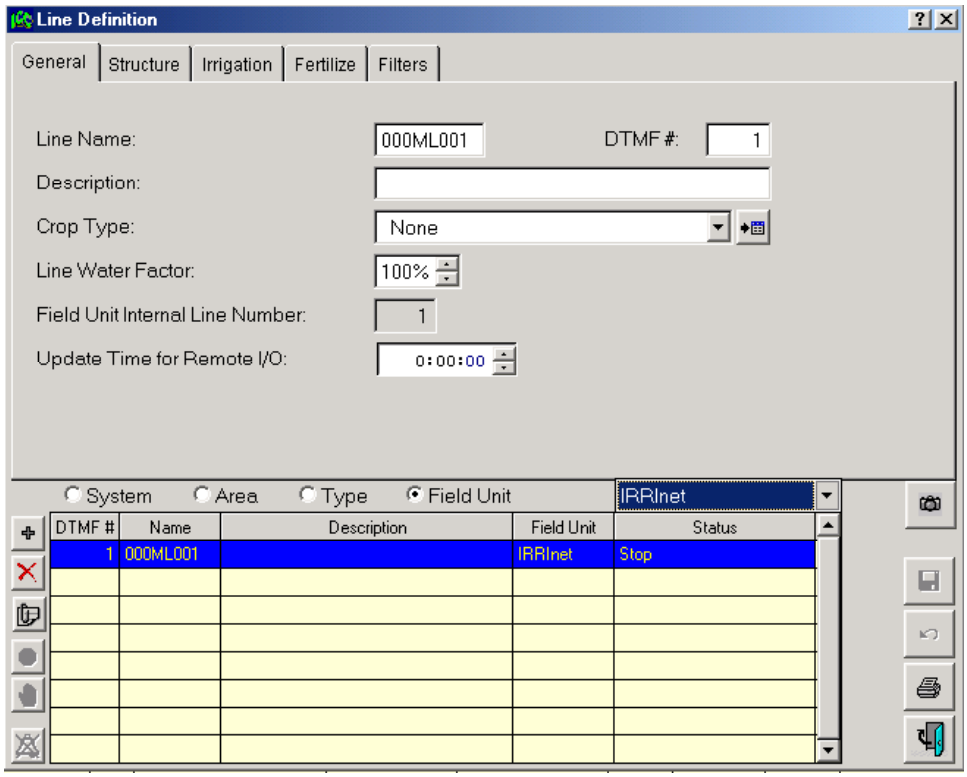
Quantity/Meter Pulses: This value is un-editable and represents the preset quantity for counter pulses defined previously in the Counter setup. In order to edit the counter pulses setting, go to the I/O definition and edit the counter.

High Flow Preset Counter: (This option is exclusive to XL/XM units only) During a running of program on this line, if a high flow accrue in two consecutive program lines within the same program group, a high flow (Event 48) is reported, the line is put to stop mode and the irrigation will skip to the next program line. The operator may choose to edit the number of high flows before Event 48 (High Flow in Line) stops the line. In other words, set the number of high flow before activation of Event 48.

Suspend Flow Control While Flushing: (This option is exclusive to XL/XM units only) When Fert filters are flushing, usually there is a change in flow. This could cause an alarm. When this flag is checked flow control is suspended while the Fert filters are flushing.

Mainline Definition for IRRInet:

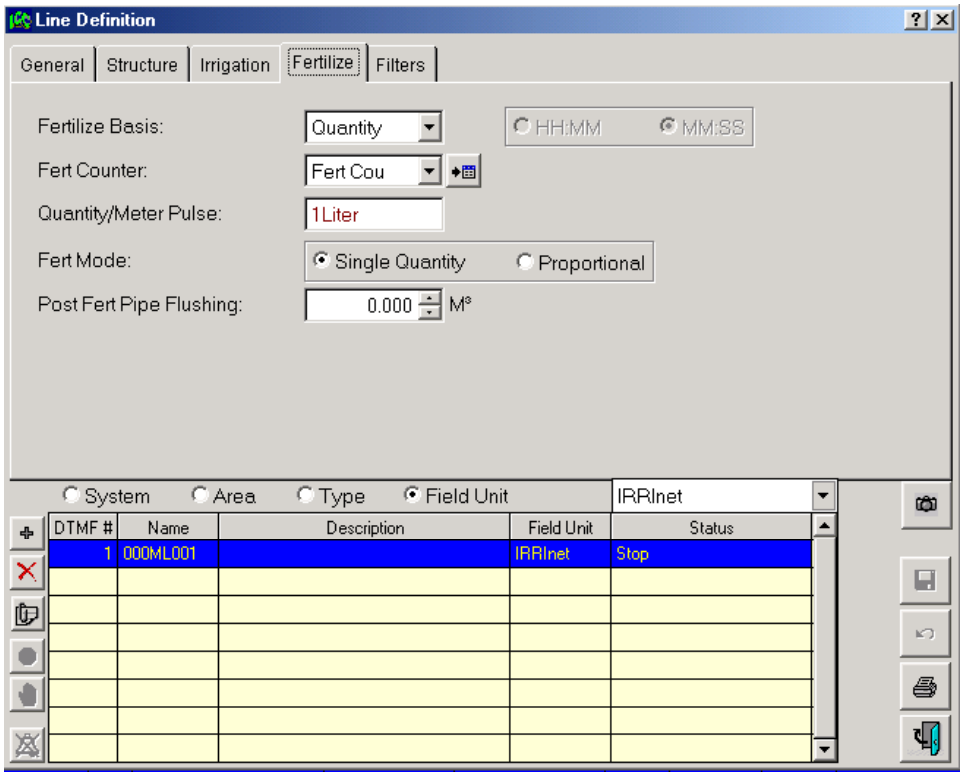
There are some basic option differences in the settings of mainline for IRRInet and IRRInet-XL. Up to now we have been discussing the mainline setup for IRRInet-XL, let us now review a mainline on an IRRInet.



Update Time for Remote I/O: Define how often the IRRInet should query the I/O's of this mainline, which are located on a Scorpio. There are cases where you may create a mainline with physical connections both locally and on Scorpios. It's is a good practice to set an update time for the IRRInet to query the Scorpios.

Line Definition: (Fertilize Tab)

Fertilize and Filters tab only exist when the line is being created on an IRRInet.



Fertilize Basis: There are two choices, you may either Fertilize based on Time or Quantity, However it is important to keep in mind that fertilizing based on Quantity require you to have preciously created a Fert meter.

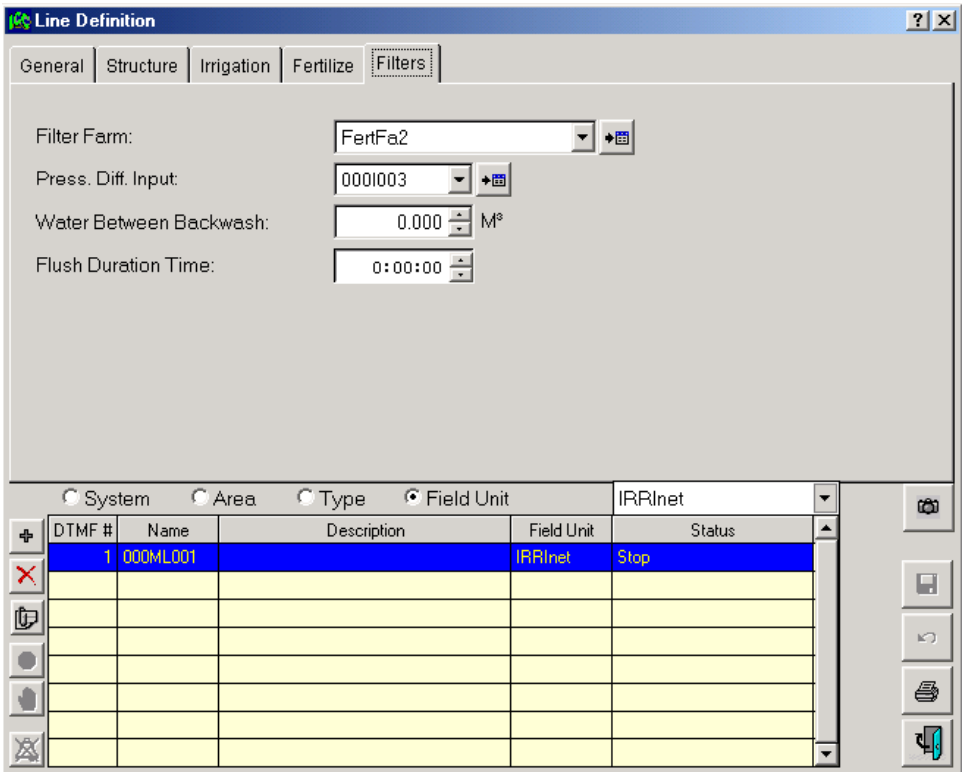
Fert Counter: Choose a Fert meter from the drop down menu. If you have not yet created a Fert meter, click on the table to the right of this option to enter the I/O definition window and create a Fert meter.

****** NOTE:** Fert meter should not have a Quantity/meter Pulse more that $1M^3$ if you accidentally choose a higher quantity ICC will not display this counter in the Fert counter list.

Fert Mode: Choose either Single Quantity, (all the Fert will be added to the line as the line starts) or Proportional (the field unit will inject the line with Fert proportional to the water).

Post Fert Pipe Flushing: Choose the amount of water in M^3 which the field unit should flush the line with.

Line Definition: (Filter Tab)



This tab only exists on mainline created on IRRInets.

Filter Farm: Choose a filter farm, which belongs to the line from the drop down list. If you have not yet created a filter farm you may click on the table to the right of this option to be directed to the Filter Farm menu.

Press.Diff.Input: From the drop down menu choose the Pressure Differential Input previously created. If you have not yet created this input you may click on the table to the right of this option to be directed to the I/O definitions in where you may created this option.

Water between Backwash: Choose the amount of water in M^3 to be used to backwash the filter.

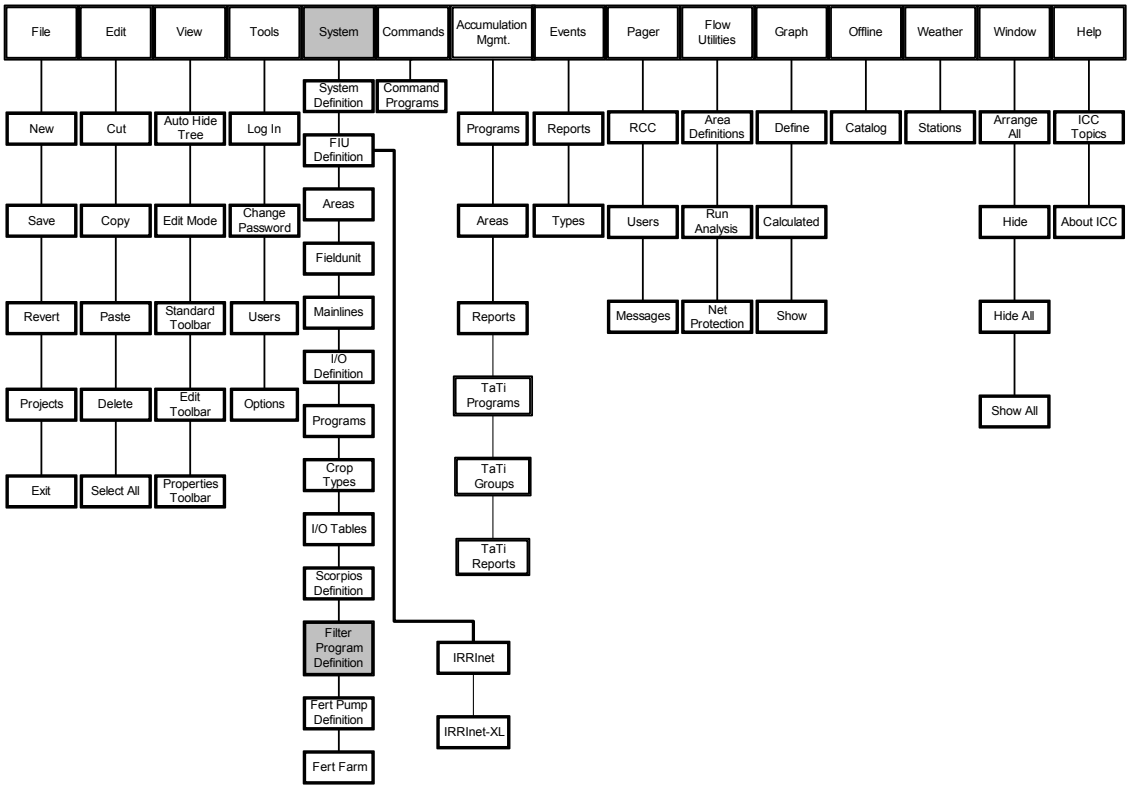
Flush Duration Time: As the menu explains you may choose the length of time the Filter should be flushed.

Filter Program Definition:

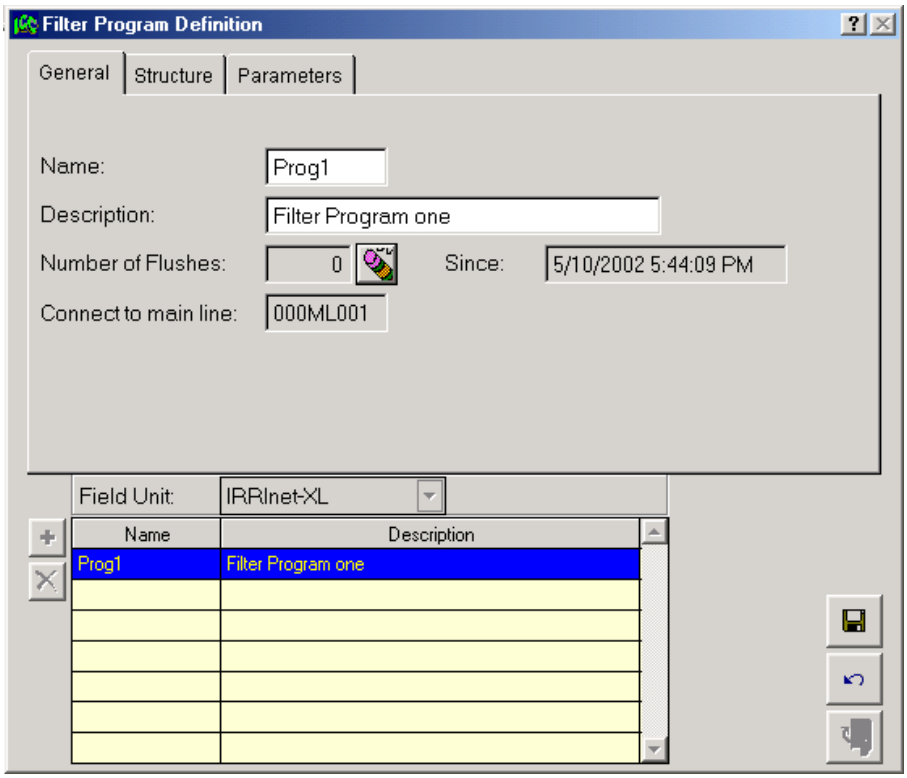
To enter the "Filter Program Definition" click on the system in the main menu and then click on the Filter Program Definition.

In this window you will be able to program how often and under what conditions to flush the filters and also assign some other advance settings.

IRRInet Control Center… 13.X



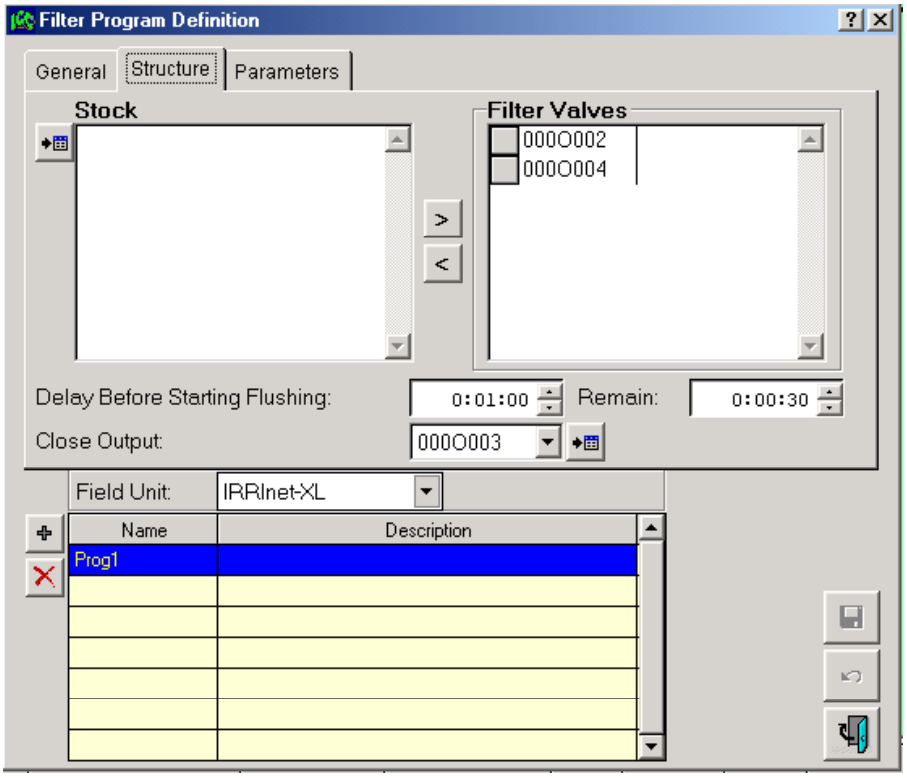
General Tab:



- **Name:** Type in the name of this Program.
- **Description:** Type in the description for this program.
- **Number of Flushes:** This value is not changeable; the number will represent the number of flushes applied on this program. After the filters have been changed you may reset this value by clicking on the icon. This button will also erase the date and time of the last time this value was erased.
- **Connected to main line:** This field displays the mainline, which this filter program is associated with. The operator may switch the program from a mainline to mainline from mainline Definitions.

Structure Tab:

Just like creating mainline here to create a filter program we need to move filters previously created from the "Stock" to the "Filter Valves" table.



If you have not yet created the filters click on the table icon on the top left of the screen, which will guide you to the "Filter Definition" screen.

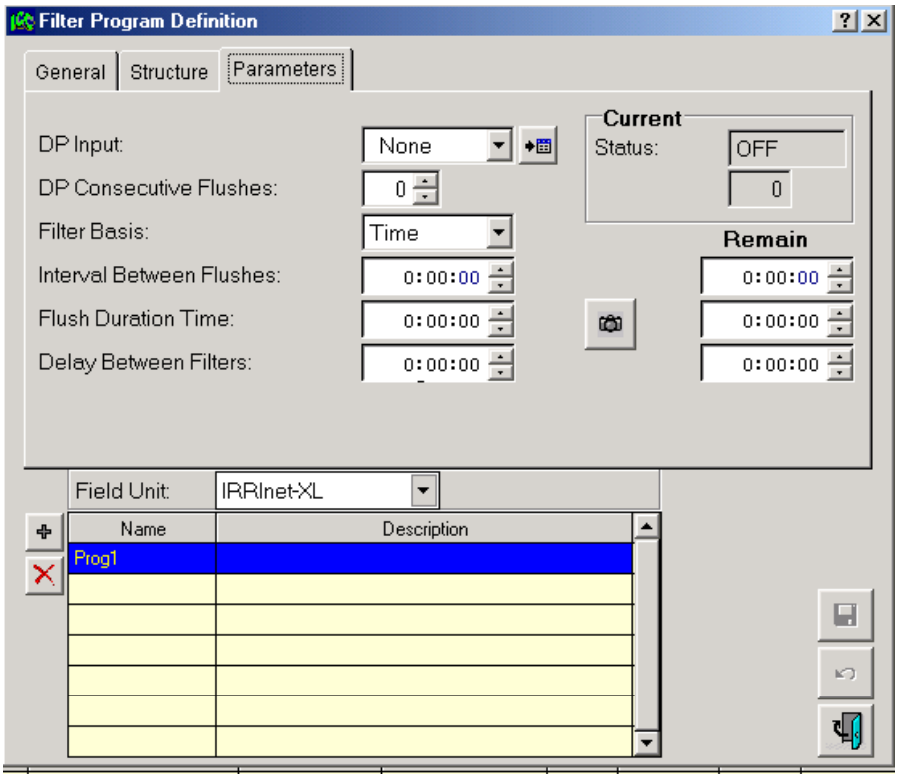
To move the Filter over from the "stock" to the "Filter Valves" you may either use the drag and drop option or highlight the valve and using the arrows move the filters in or out of the "Filter Valves" table.

Delay Before Starting Flushing: Sometimes it is necessary to delay the flushing of a filter program do to pressure in the line and other factors this option exists for this reason.

Remain: You may change the time remaining on the Flush by either increasing or decreasing this time. For example if the line is scheduled to flush for 6 minutes and has been flushing for 4 it means that there is 2 minutes remaining, you may increase the 2 minutes to 5 minutes by changing this value to 5 minutes and clicking on save. On the other hand you may enter 30 seconds and changes the time remaining from 2 minutes to 30 seconds.

Close Output: On a filter flush program it is sometime necessary to close an output to enable back flushing of the filters. Choose that output from this drop down menu.

Parameters Tab:



DP Input: Deferential Pressure input

DP Consecutive Flushes: Number of flushes when DP is activated.

- **Filter Basis:** Choose whether the filter flushing is based on time or quantity.

- **Interval Between Flushes:** Enter the time between each flush. Remain: Length of time remained before next flush. Click on the camera to get the latest time.

- **Flush Duration Time:** Enter the length of time the Filter program should flush. Remain: Length of time remaining before this flush time is over, Click on the camera to get the latest time.

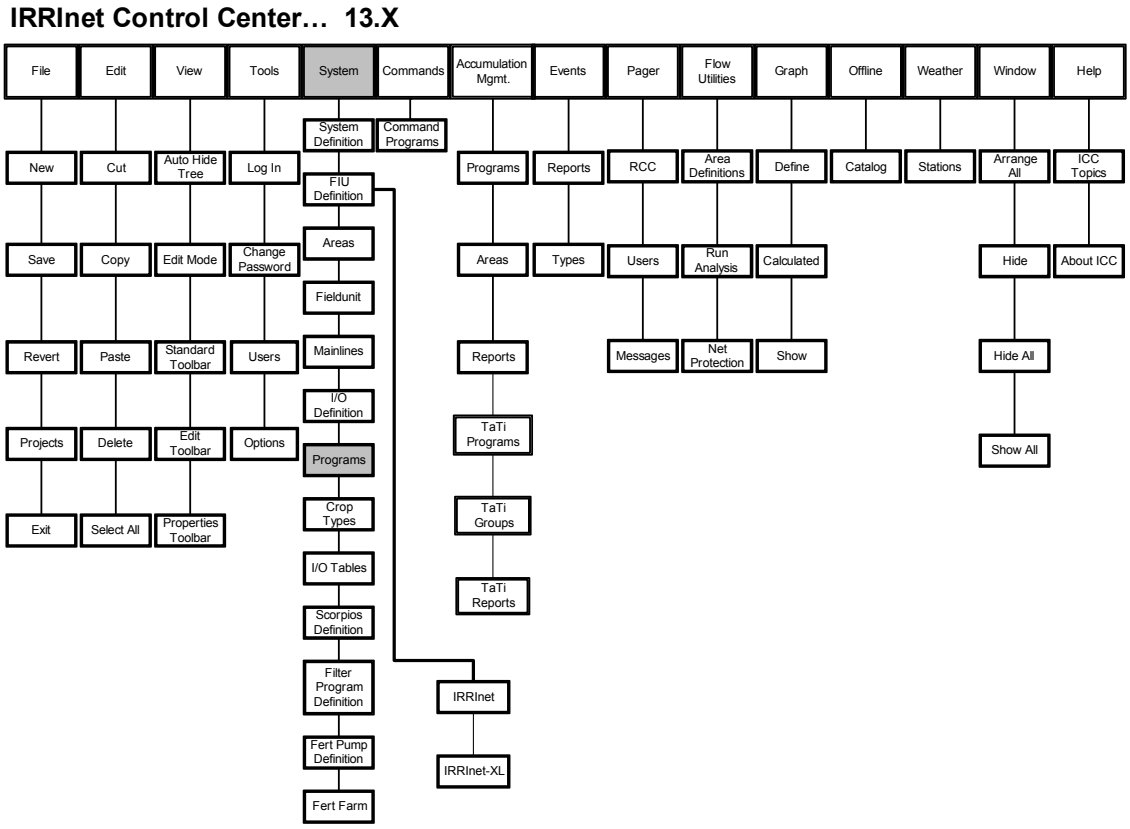
- **Delay Between Filters:** Enter length of delay before the next Filter on line starts flushing. Remain: Length of time remaining till flush of the next filter in line.

- **Current:** This field will display the status of the program now, on/off. The field beneath the status displays the remaining flushes if the program is on.

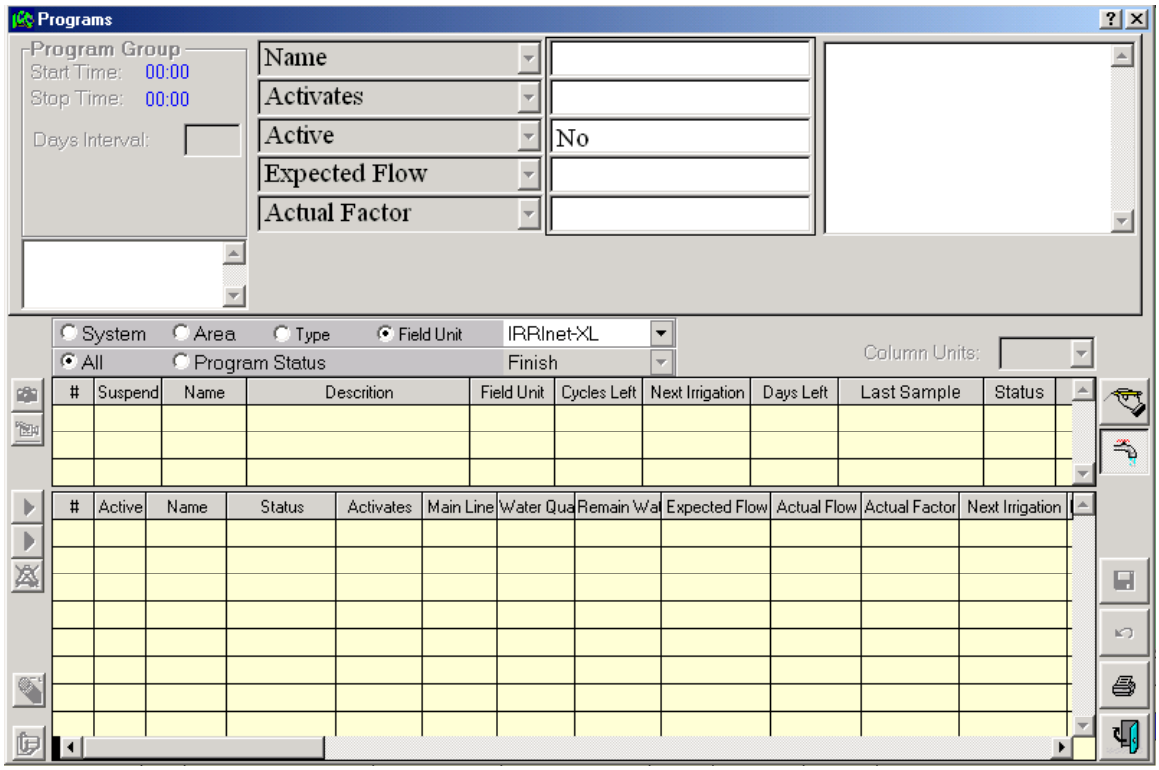
Programs:

From the program window you will be able to view current program status, write new program, and use some advance options in programming such as conditions. To get started lets first familiarize with the programming window.

From the main menu choose "system" and then click on "Programs"



Short Cut: You may also get to this window by right clicking on a valve in the Fixed or user screen and clicking on view programs:



The window that first appears (Above) is the view screen for Programs. In this window you will not be able to change the programs but just view the current the state of programs by either "Sampling" a line of programs and/or a group of programs.

- **Program Line:** A program that consists of a set of, conditions, base of irrigation, time and date of irrigation, cycles etc.

- **Program Group:** Consists of Set of program line, for one set of Valves.

Let us review some of the icons and options of the program view screen before we move on.

With in the view programs window you will see the following icons.

Click this button to initiate sampling of the highlighted "program line".

Click this button to initiate sampling of the highlighted "program group".

Click here to attach a note to this program.

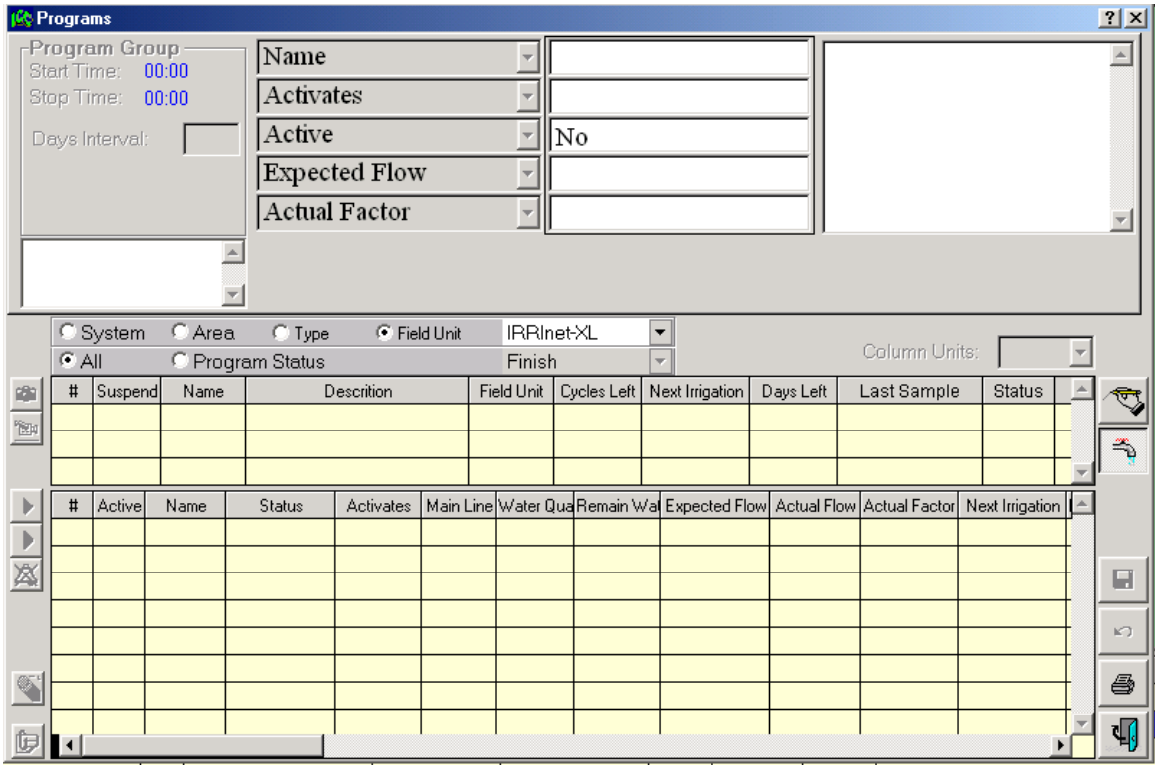
Click here to start irrigation on this program right "now".

Click here to irrigate today, if you have set the irrigation on lets say Monday and Friday and today is Tuesday, by clicking this button you will irrigate today at the time set to irrigate normally.

Programming window icons:

Click on this button to "Clear Order", we will explain in more detail later in this section.

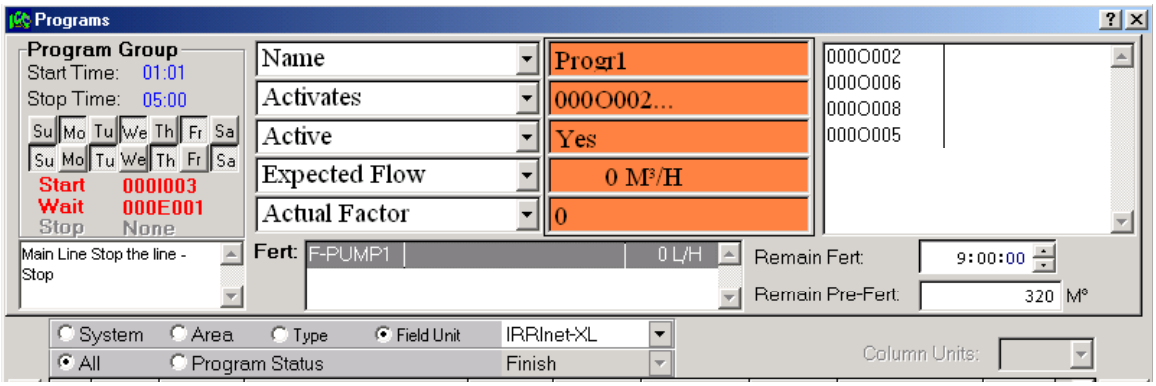
Click on this button to set order, a new window will open allowing you to move programs from group to group. We will review this in more detail later in this section.



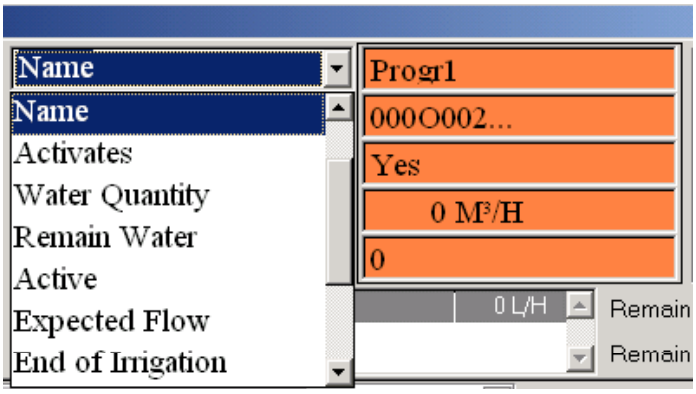
In general the top portion of the programming window will display details of the program line you are viewing.

Lets have an overview of this portion.

Note: if there is no Fert on this line, the Fert portion of this program will not appear.



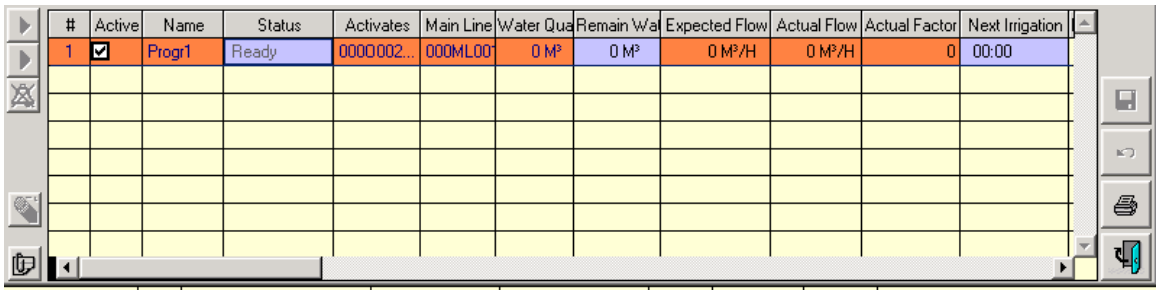
This part of the window is very customizable there are 5 fields that you can choose what information you would like to view in them and from what table. Here we have chosen to see the name of the program in the first field.



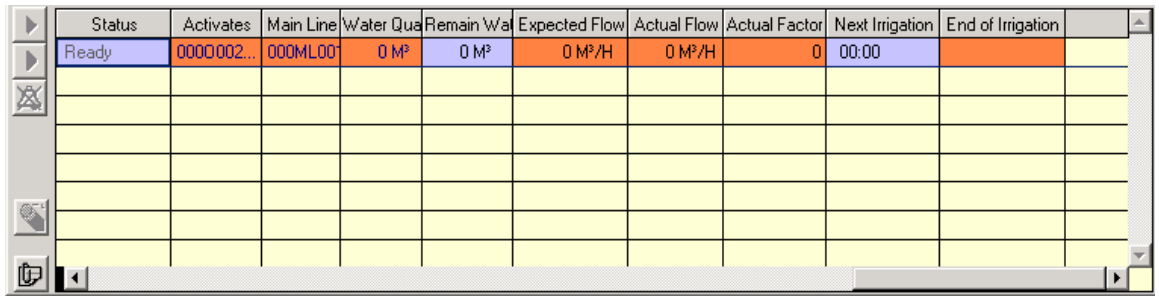
By using the drop down menus on each of these five fields you may change the view to any of the table options. You may also scroll through the table by using the cursor at the bottom of the program window.

Using the mouse pointer grab the bar with the left mouse button and drag it from side to side to view the rest of the table. (Bellow)

Arrow all the way to the left: (Starting with # table to the Next Irrigation table)

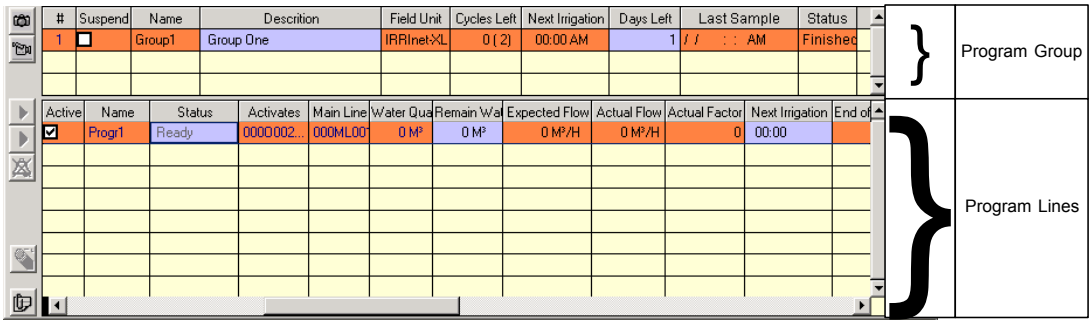


Arrow all the way to the right: (Starting with Status to End of Irrigation table)



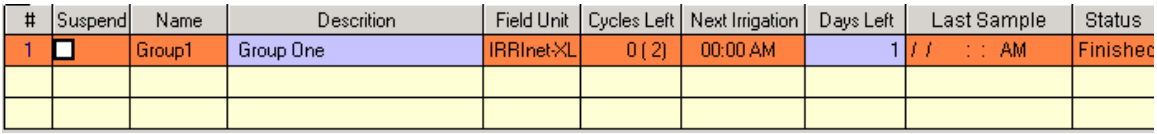
Any of these options may be chosen in the drop 5 fields at the top of the page for quick viewing. Let us review each one of these options.

At the bottom of the screen as you can view there are two parts to the window.



The top portion represents the Group of programs, and the bottom portion is the programs that belong to this group. For example, Group 1 Programs was created and a program line called program 1 is included within it.. Let us review the meaning of some of these columns and then we will go on and create a program group and some program line.

Program Group Columns:



#	Suspend	Name	Descrition	Field Unit	Cycles Left	Next Irrigation	Days Left	Last Sample	Status
1	☐	Group1	Group One	IRRInet-XL	0 (2)	00:00 AM	1	/ / : : AM	Finished

— **Group number.**

Suspend — **Check this flag if you would like to disable the group without deleting it.**

Name — **Name of the program Group.**

Descrition — **Description of the program Group.**

Field Unit — **Name of the field unit the Program Group belongs to.**

Cycles Left — **Number of Irrigation Cycles left in this irrigation group.**

Next Irrigation — **The time of next irrigation within this irrigation group.**

Days Left — **Number of days left till next irrigation cycle of this group.**

Last Sample — **Last time this irrigation group was sampled.**

Status — **Current status of this irrigation group.**

Program Line Columns:

There are 13 columns to this option

#	Active	Name	Status	Activates	Main Line	Water Quantity	Remain Water	Expected Flow	Actual Flow	Actual Factor
1	☑	Progr1	Ready	0000002...	000ML001	0 M³	0 M³	0 M³/H	0 M³/H	0

Arrow right!

Next Irrigation	End of Irrigation
00:00	

**Number of the program line** **Active** **Check this flag to make this program line active or deactivate without deleting it.**

Name **Name of this program line.**

Status **Current status of this program.**

Activates **Name of the outputs this program line activates.**

Main Line **Name of the main line activated by this program line if any.**

Water Quantity **If irrigating based on quantity, this field will display the quantity of water per irrigation cycle.**

Remain Water **If irrigating based on quantity, this field will display the remaining water for this cycle.**

Expected Flow **If irrigating based on quantity this field will display the expected flow for the line, the expected flow is the flow previously programmed for the Counter of the line. Go to the counter section of this manual for more info.**

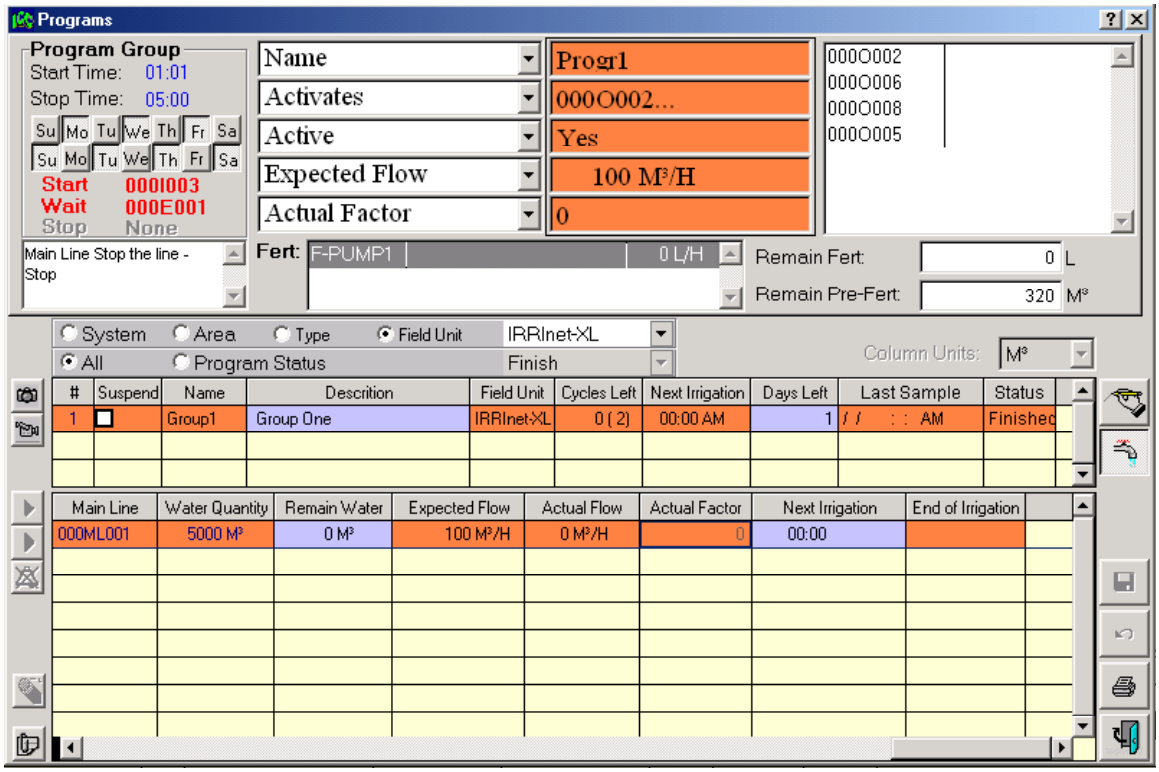
Actual Flow **Click on the sample icon to get the actual flow, during the run time of the program.**

Actual Factor **Actual water factor on the program line is displayed in this field. The actual water factor is dependent on weather station (if any) and manual setting of the water factor.**

Next Irrigation **This filed will display the time of the next irrigation, to get the latest info sample the program line.**

End of Irrigation **This filed will display the end time for this program line. Click on the sample button to get the latest status on the options.**

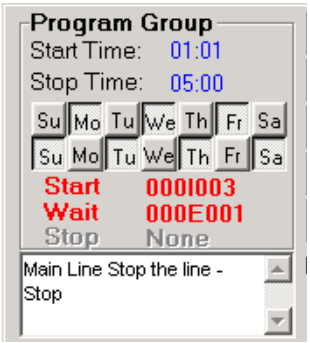
When viewing the status of a program line, there are other specific options at the


Programs
Program Group
Start Time: 01:01
Stop Time: 05:00
Su Mo Tu We Th Fr Sa
Start 0001003
Wait 000E001
Stop None
Main Line Stop the line - Stop
Name
Progr1
Activates
000O002...
Active
Yes
Expected Flow
100 M³/H
Actual Factor
0
000O002
000O006
000O008
000O005
Fert: F-PUMP1 0 L/H
Remain Fert: 0 L
Remain Pre-Fert: 320 M³
System Area Type Field Unit IRRInet-XL
All Program Status Finish
Column Units: M³
Suspend Name Description Field Unit Cycles Left Next Irrigation Days Left Last Sample Status
1 Group1 Group One IRRInet-XL 0 (2) 00:00 AM 1 / / : : AM Finished
Main Line Water Quantity Remain Water Expected Flow Actual Flow Actual Factor Next Irrigation End of Irrigation
000ML001 5000 M³ 0 M³ 100 M³/H 0 M³/H 0 00:00

top of the window.

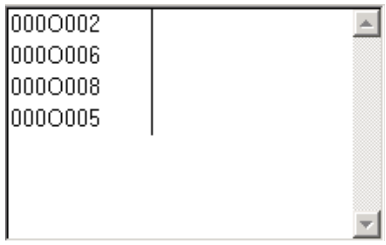
Program Group:

(Top left of the screen) Within this column there are the start time and stop time of the program group you are viewing with the days of the week for the irrigation checked bellow it. ICC irrigates based on two-week period, which



allows the user to program based on 14-day period not having to skip a day of irrigation or irrigate two days in a row to catch up. If you have any condition attached to this program, such as wait on irrigation if an input is active or other wise; you may view that option also here, marked in red.

When writing a program note which week of irrigation cycle you are in, reminder we set this option in the "Parameters tab" of the "System Definition".

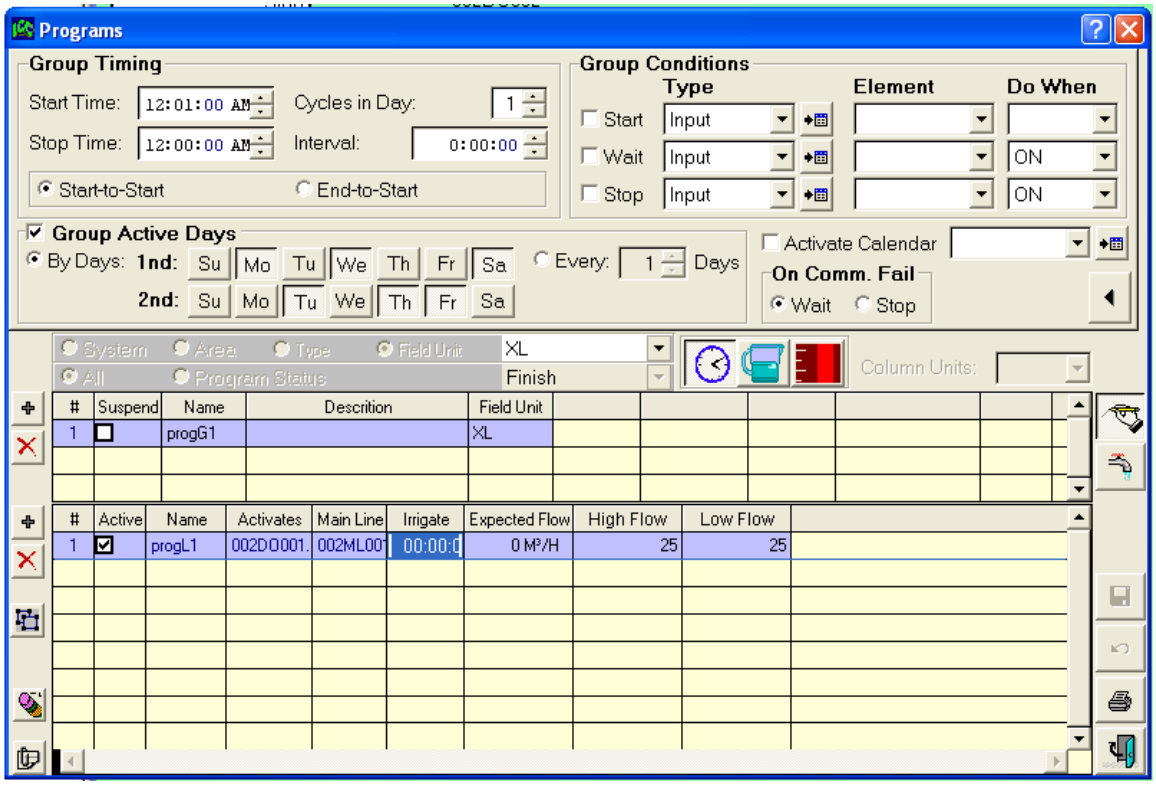


At the top right of the screen in the white box, the list of outputs affected by this program line is displayed.

Fert option located in the middle of the screen displays the Fert pump attached to this program line and Fert remaining for the program.

Let us now write a program:

Writing an irrigation program:



In order to change from "view program" mode to "write program" click on the

The screen changes to programming mode.

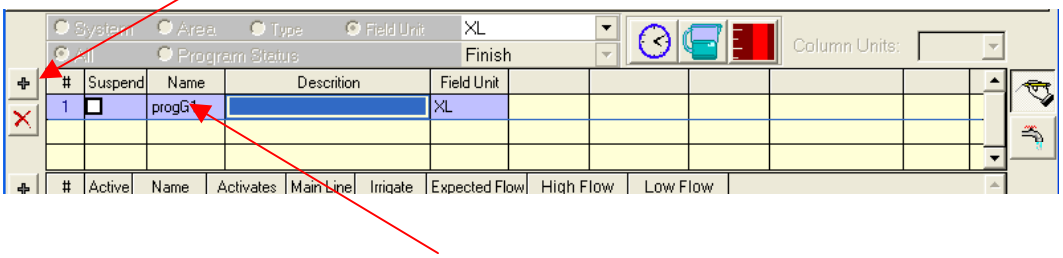
Creating a program Group:

We first need to create a program Group

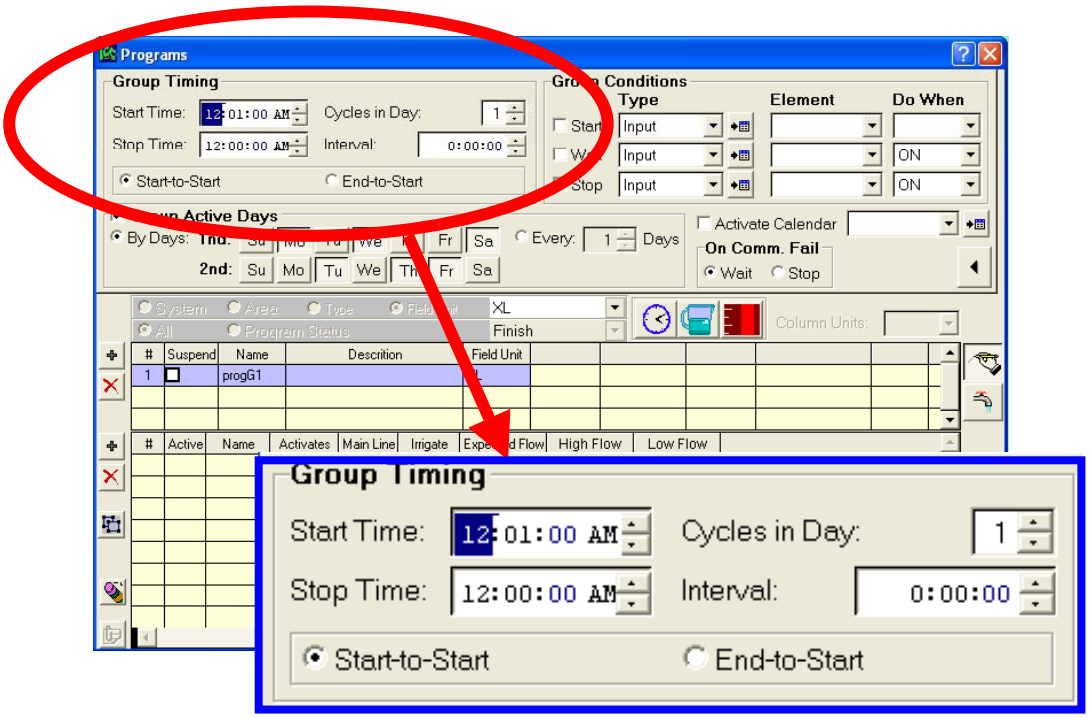
- Check the flag for field unit and choose the field unit, which you are writing this program for. You may choose the field unit by utilizing the drop down menu to it's right.

Once you have chosen the field unit click on the to enter the write program mode.

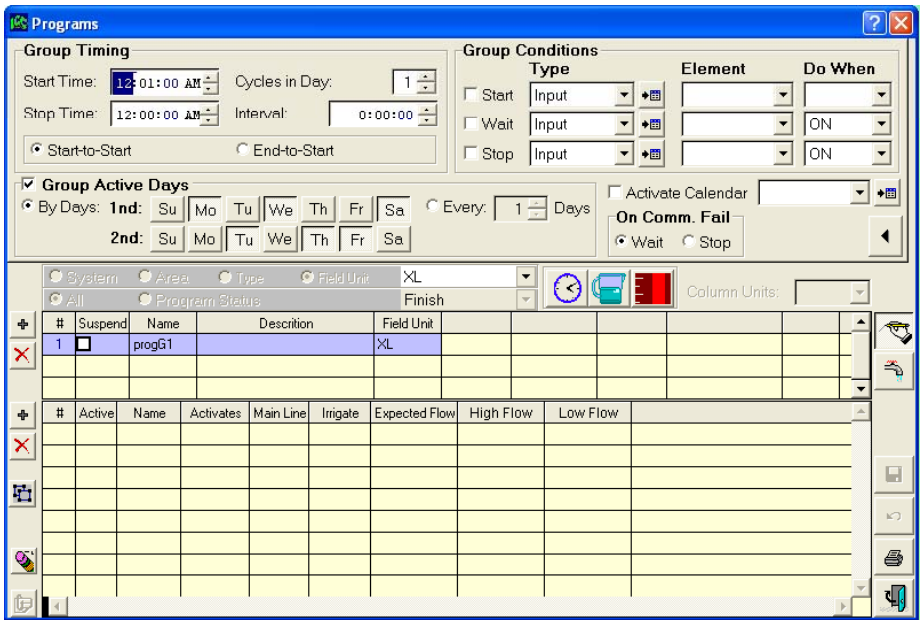
Click on the "+" sign to add anew program group.


XL
Finish
Column Units:
Suspend Name Description Field Unit
1 progG1 XL
Active Name Activates Main Line Irrigate Expected Flow High Flow Low Flow

- Click in the "**Name**" field of the program group and type in a name.
- Click in the "**Description**" field and type in a description.



- **Start Time:** Choose the irrigation start time for this program group.
- **Stop Time:** Choose the stop time of the program group.
- **Cycles in Day:** Choose how many cycles should this program run for.
- **Interval:** Type in the interval time between each cycle.
- **Start-to-Start:** "Start to Start" time means if you choose your interval to be 60 minutes and irrigation time 20 minutes the actual time between irrigation will be 40 minutes.
- **End to Start:** "End to Start" time mean if you choose your interval to be 60 minutes and the irrigation time is 20 minutes, after the irrigation group ends, the RTU will wait 60 minutes to start the next interval.



Group Active Days

Irrigation by Days of the week:

The operator may choose to either irrigate base on days of the week, by checking the flag for "By Days" and clicking on the icons of weekdays for the irrigation. As mentioned before ICC irrigates based on 2-week intervals.

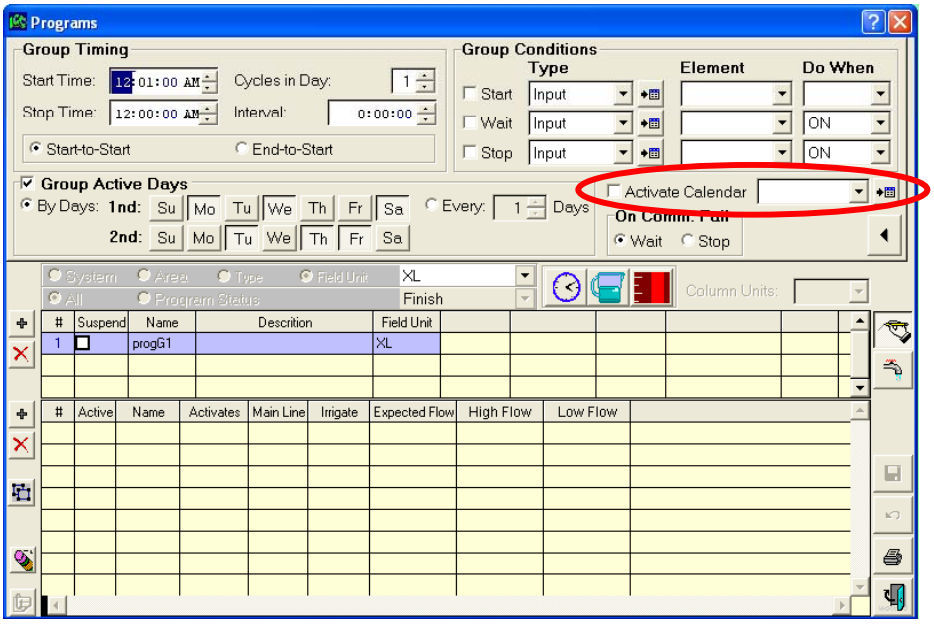
Irrigation by daily intervals:

To choose this option simply check the flag for "Every" and choose the number of "Days".

On Comm. Fail: The operator needs to make a decision on what action should be taken if there is a communication failure with this RTU. Choose wait if you would like this program to "Wait" if you like this program to go to wait mode or "Stop" if you don't want this program to run, incase of communication failure with the central.

Active Calendar

The last option to review in the Program Group is the Active Calendar:

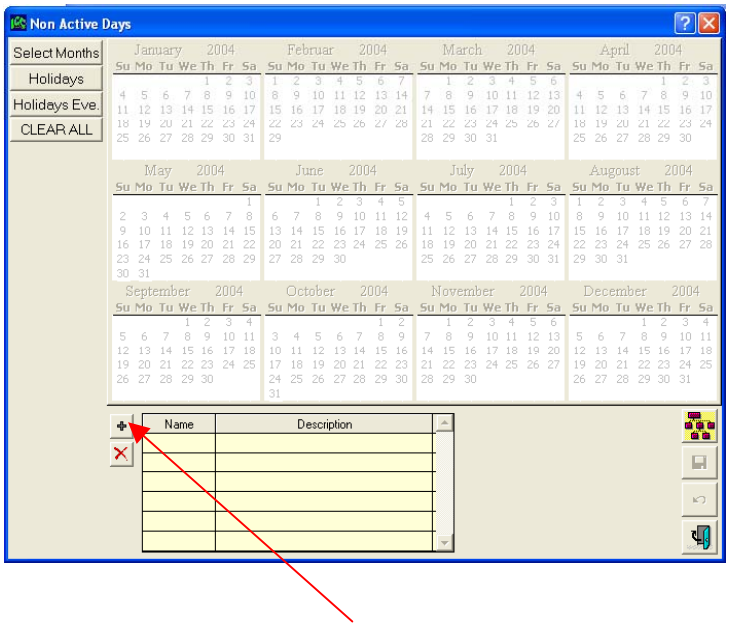


Active Calendar:

What is Active Calendar? Active calendar is a yearly (365 day calendar), which resides within each RTU. By using active calendar a programmer may schedule days with in the year no to irrigate.

To create a new active Calendar Click on the Table icon by the drop down menu…

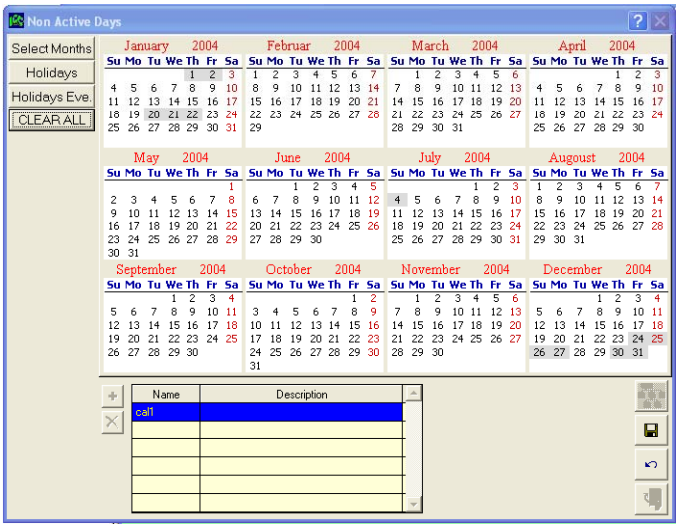
A new window will appear.



Click on the "+" to create a new schedule.

1. Click on the name of the months you would like to create schedule for, or choose "Select Moths" to highlight all the months.

2. Click on the days you would like to schedule as non-irrigation days.



Note: Currently the Holidays and Holidays Eve are not programmed to be automatically selected. These options will be available in the future versions of ICC.

3. Once all the days are selected click save.

4. Click on the to send the new schedule to all field units.

The options that you have chosen up to now were for a "Program Group". In the next section we shall cover programs associated with this group.

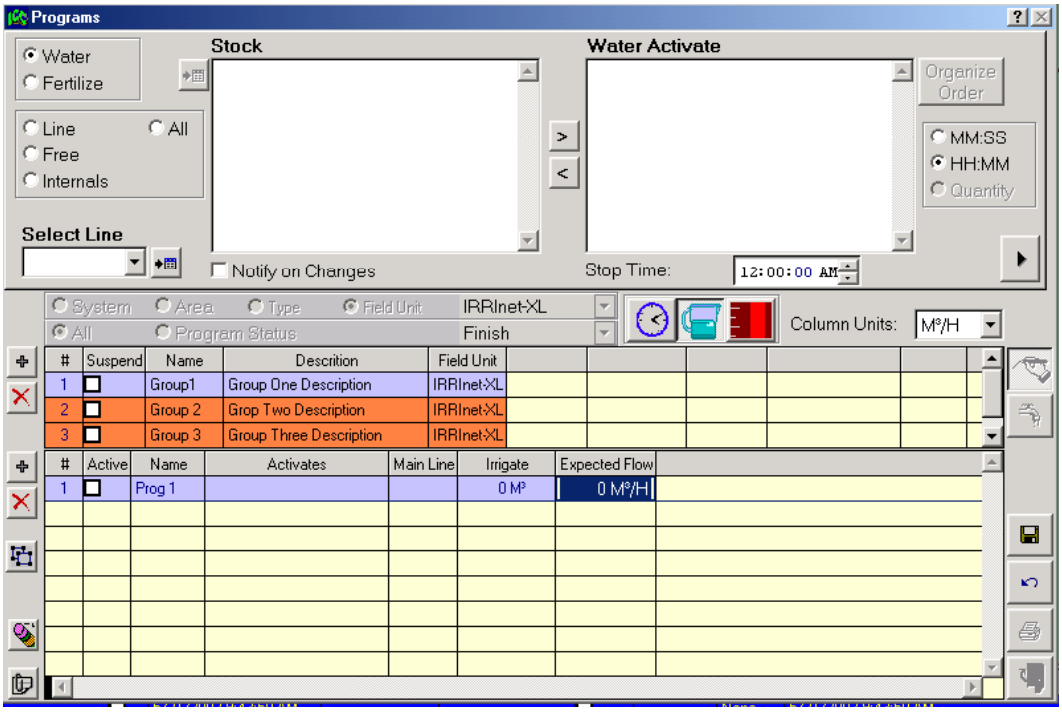
Program Lines:

Before we go on, lets me just note that IRRInet-XL can hold up to 500 programs, this mean; you may write one program group with up to 500 program line or 100 program groups with 5 program line. It doesn't matter what combination it should not exceed over 500 lines of program.

IRRInet however has less memory and consists of 2 different chips. One of which is 99 programs and the other 200 programs.

Now on with the programming:

Choose a program group by highlighting it (bellow purple)



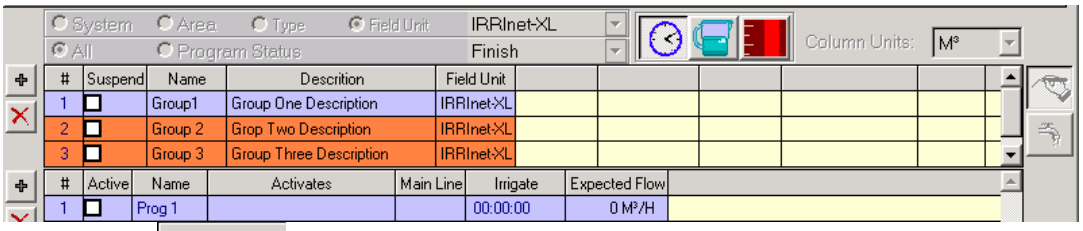
Click on the "+" sign in the program line area to add a program.

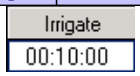
Type in a name for this program (i.e. Prog 1)

By clicking in the "Irrigate" column 3 new options appear by the Field unit name

Click on this button if you like to irrigate based on time.

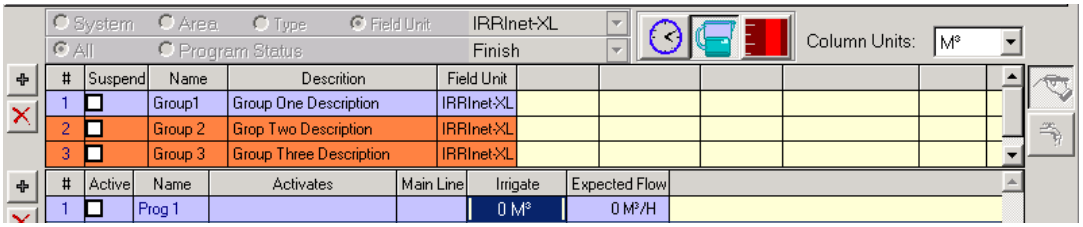
When you click on this button the irrigate table changes and displays a time.





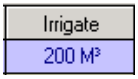
To set the time for the irrigation line, click in the "Irrigate" table and type in a time.

Click on this button to irrigate based on volume.



When you click on this button the irrigate table changes and displays a time.

From the "Column Units" choose the measuring unit for the irrigation. (There are both metric and English units)

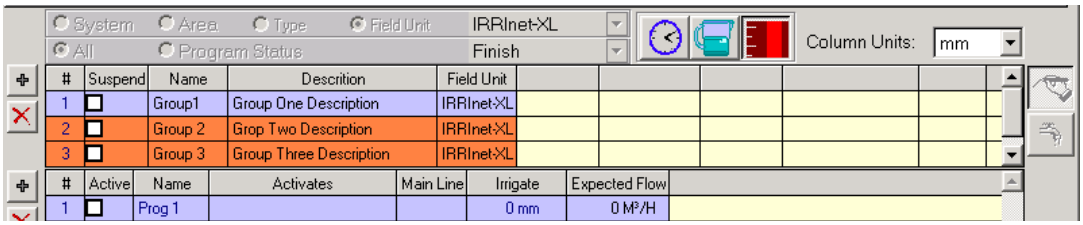


To set the volume for this irrigation program, type in the volume of water for the irrigation in the "Irrigate" table.

Click on this button to irrigate based on depth.

Irrigation based on depth requires you to choose the depth of irrigation.

Choose the depth of irrigation for this line from the "Column unit"; the units are in both metric and English.

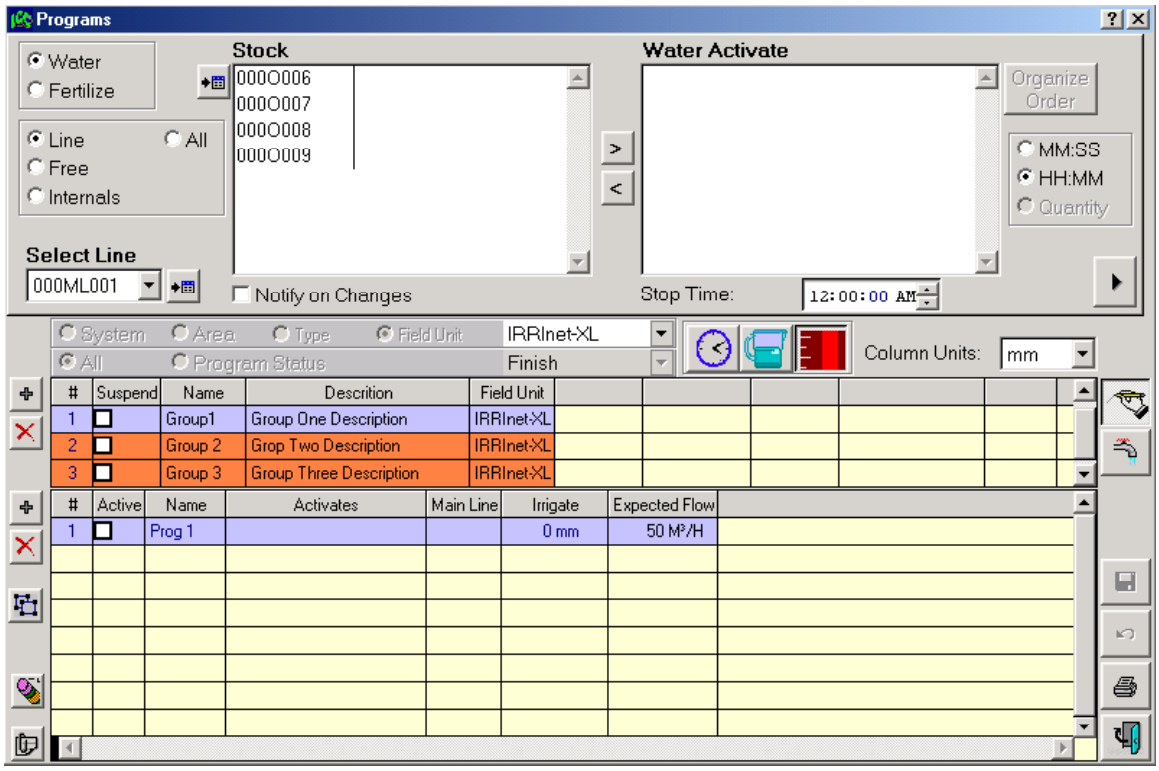


Type in the depth of irrigation in the "Irrigate" column.

Expected Flow:

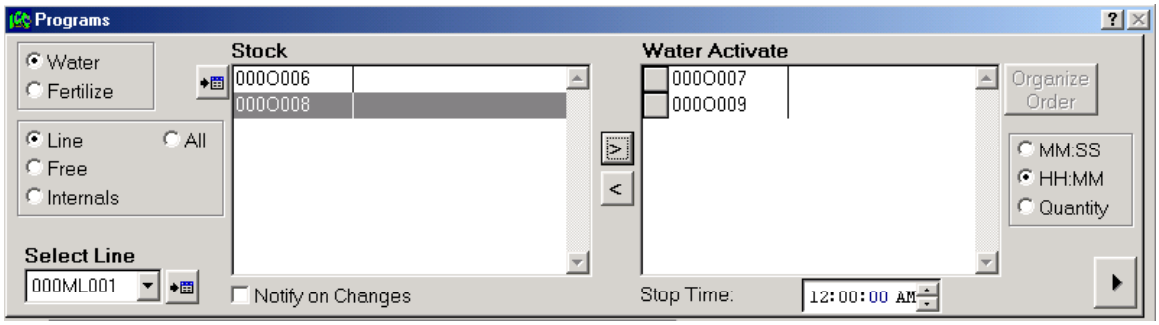
The expected flow is where you would choose the expected flow for the program line. Your future high and low flows alarms will be based of this value. We set the percent deviation for high/low flow alarm in the "Irrigation tab" of the "Line Definition".

Choosing Irrigation Valves:



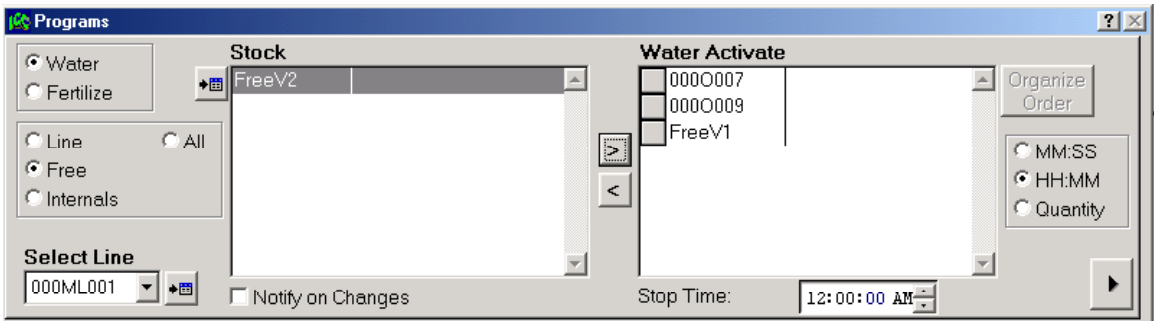
Check the "Water" flag to add irrigation valves. In order to make it easier for the operator to choose the find the valves there are options here to allow you to narrow you search. By choosing checking the flag for "Line", the list of lines will appear in the drop down menu of "Select Line". Drop the menu using the arrow and choose the line which you are writing programs for. List of the valves on the line appear in the stock.

Highlight a valve by clicking on it under the "stock" column and use the arrow to



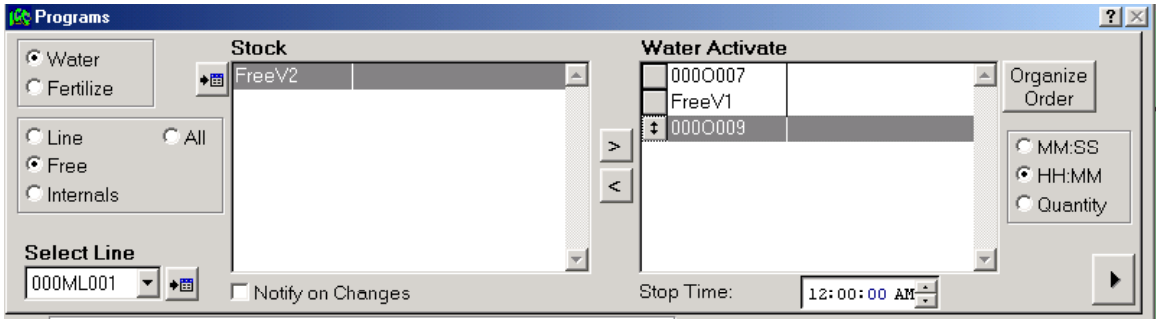
add it to "Water Activate" column.

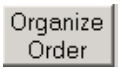
You may then add more valves by either checking the "Free" flag to reveille the list of free valves, or by checking the "Internal" flag and choosing Internal valves.



To reveal all the valves on this RTU check the "All" flag.

Sometime the order of the valves in the "water Active column are not organized; when this happens the valves which needs to be moved gets a double sided arrow on it's block such as valve "000O009" in the bottom image.



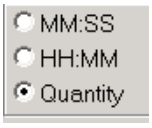
To reorganize the order of these valves you may either click on the 

button or move the valve up or down manually, by using the mouse.

Notify on Changes: Check this box to be notified when there is a change of state in this program line. As you may remember there is an option to be notified for changes in states of all programs in the "Field Unit" menu. If you did not choose that option you may choose to be notified of changes in an individual program line when this box is checked for that program line.

Stop Time: Choose the time to stop this program line. When this time is set no matter what the program groups setting are this program line will not run after the time set in this box.

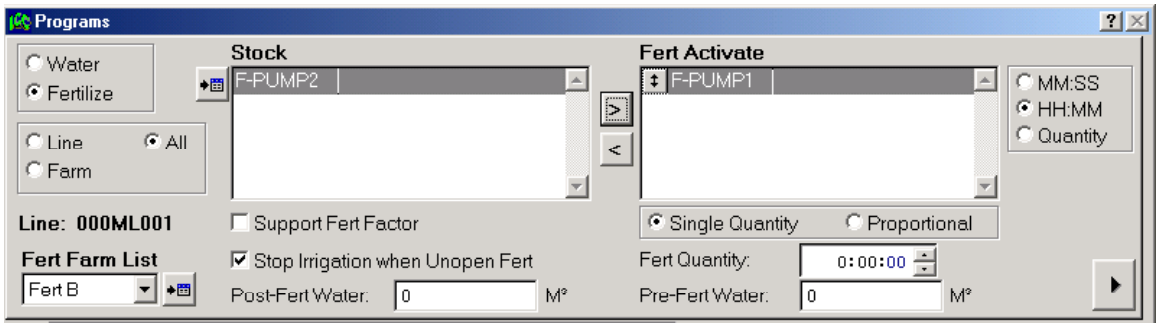
Irrigation Basis:



The operator may choose to irrigate based on both time and volume. The program will act as which ever comes first. For example you may specify to irrigate 100 Gallons or 20 minutes, if the 100 Gallons of water is irrigated in 15 minutes then the irrigation is finished vise versa if 20 minutes is met and only 50 Gallons of water is irrigated, the program is finished. To set this use one of these options. If you are irrigating based on time in the "Program Group" then check the flag for quantity and type in the amount of water in the "irrigate" column of the program line.

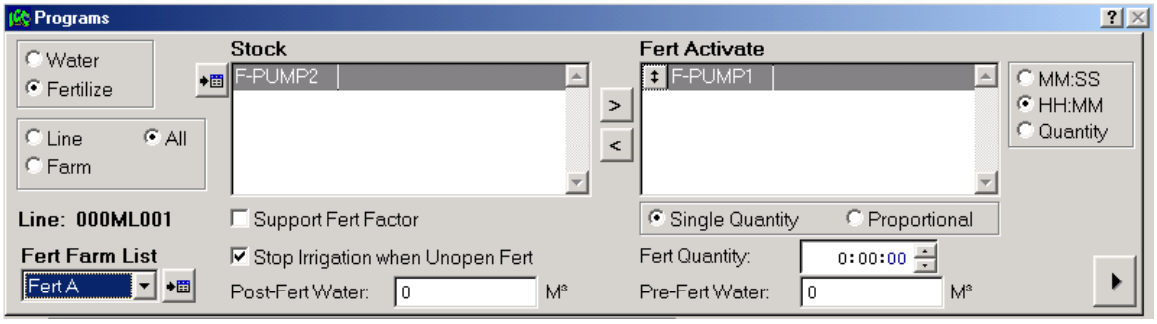
Fert Pump Programming:

Check the Flag for the fertilizer:



List of Fert pumps appear in the "Stock" column. Just like programming irrigation valves uses the arrows to move the desired "Fert Pump" to the "Fert Activate" column.

*****Note:** You may also choose a pump from a Fert Farm, by checking the flag for "Farm", the list of Fert pumps within this Fert farm become apparent under the stock column.



Support Fert Factor: When this box is checked the Fertilizer Factor changes with the Water factor. For example if the water factor has been changed by the weather station to 50 percent the fertilizer factor will be also changed to 50 percent.

- **Stop Irrigation When Unopen Fert:** You may choose to stop irrigation if the Fert pump is on but the counter is not registering any count. This could mean that the Fert tanks are empty. If this flag is checked the irrigation will stop.

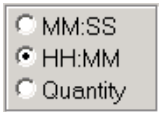
- **Single Quantity vs. Proportional:** Choose if you'd like the Fert to be injected into the line proportional to the Water or all in a single quantity after pre-Fert water.

-

Example: If you choose "Proportional" and the program line is irrigating 500 gallons with 100 gallon of Fert; then for every gallon of Fert the program will inject 5 gallon of water. However if you choose Single quantity, the Fert pump turns on and pushes all the 100 gallons of Fert and shuts off.

Note: If you choose to fertilize based on Proportional, the Fert pump will be turning on and off often. This could cause more ware and tare to the Fert pump.

- **Fert Quantity:** By choosing to inject fertilizer in the line by either quantity or time, type in the appropriate value in this window. Change between time and quantity using the options.

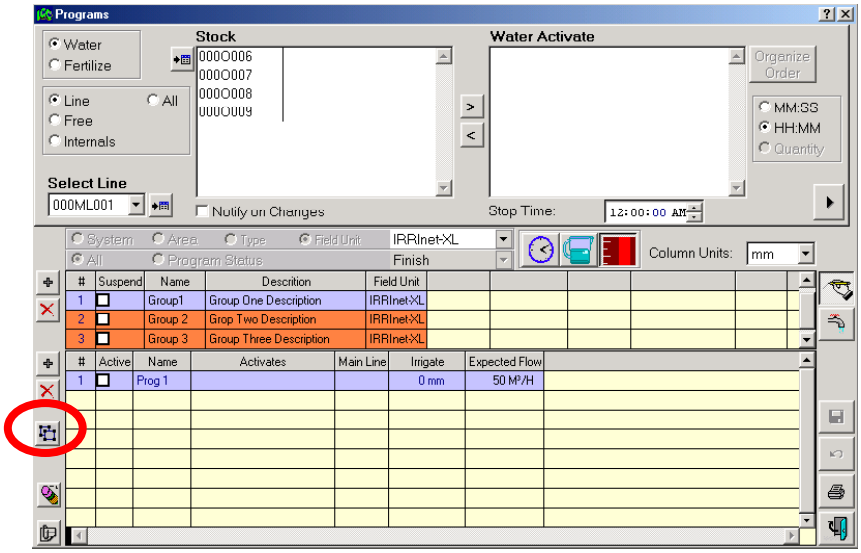


- **Pre Fert Water:** The amount of water that should start on the line before fertilizer pumps start injection.

- **Post-Fert Water:** The amount of water that should be used to flush the line after the fertilizer pump has stopped.

Finally save your program line.

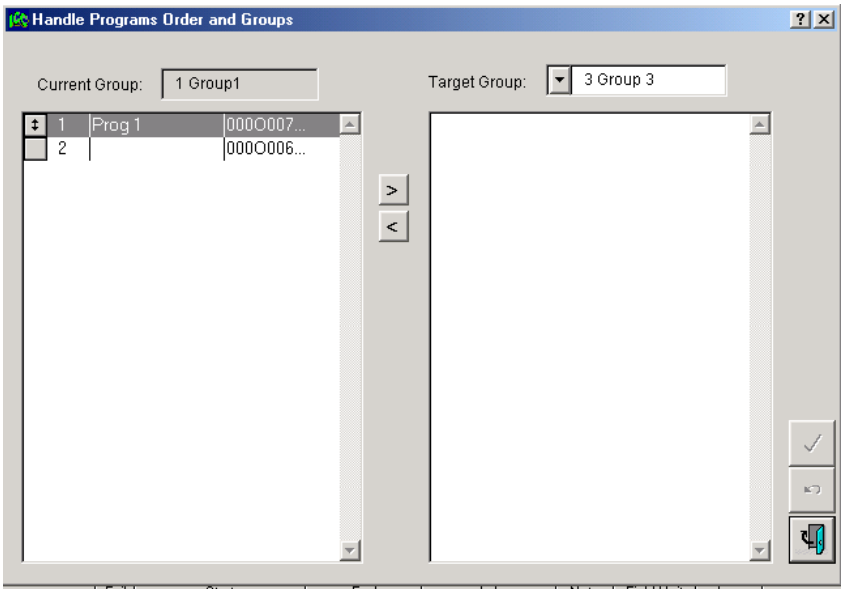
Handle Order and Groups:



This option will allow the operator to move a "Program Line" from one "Program Group" to another.

Highlight the "Program Group" that you are moving a "Program Line" from.

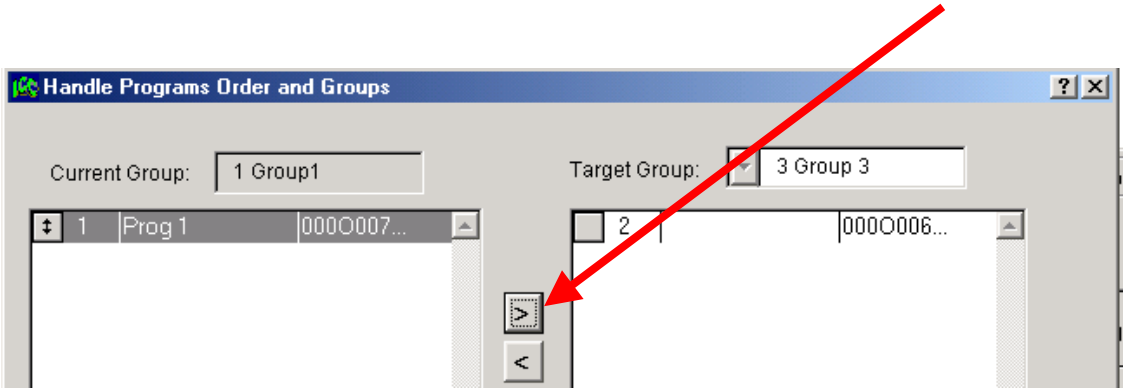
In the "Programs" window click on the button, a new window will appear.



From the

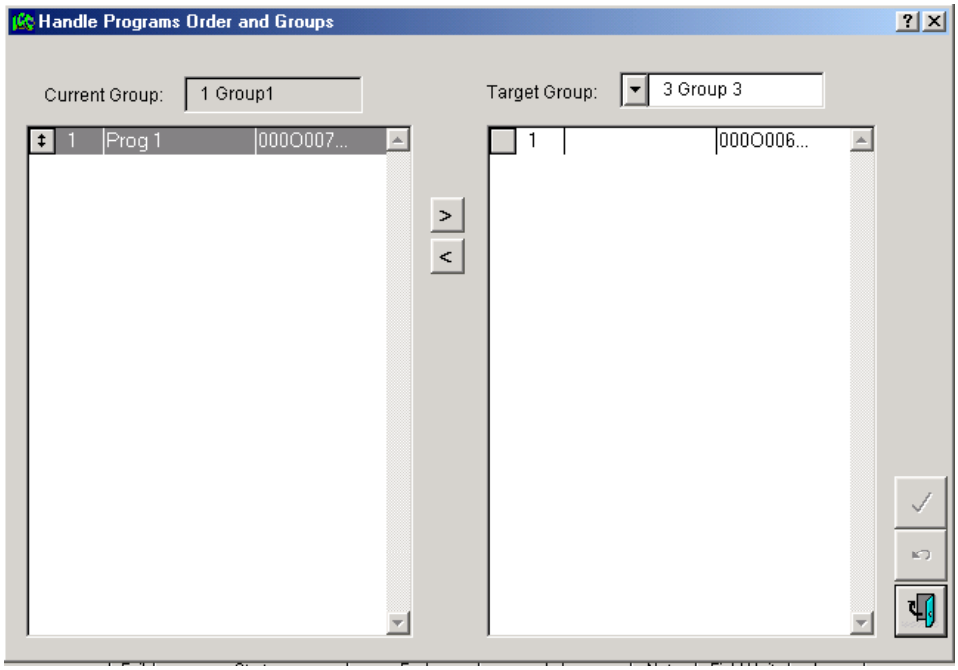
(Target Group) choose the Program Group which you are transferring the program line to. (Target Program Group)

Click on the program line you are transferring and using the Arrows in the middle



move the program line over to the Target Group.

Once the program has moved over you may choose to return the program line by using the reverse arrow other wise click on the button

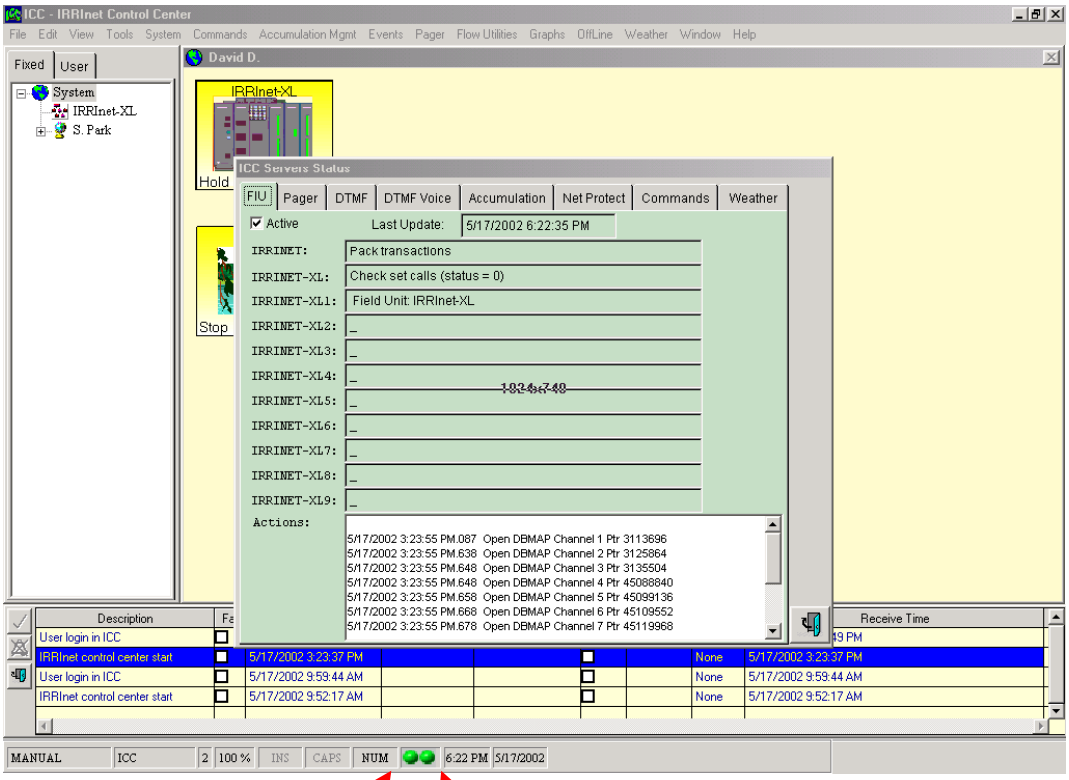


Notice that the program line you moved over has now changed its program line number.

Click on the exit door to leave this screen.

Activating Communication Services (Servers):

After you have successfully registered your ICC software, defined a project, and complete the Security Setup screens. You will need to setup the various


ICC - IRRInet Control Center
File Edit View Tools System Commands Accumulation Mgmt Events Pager Flow Utilities Graphs OffLine Weather Window Help
Fixed User
System
IRRInet-XL
S. Park
David D.
IRRInet-XL
Hold
Stop
ICC Servers Status
FIU Pager DTMF DTMF Voice Accumulation Net Protect Commands Weather
Active
Last Update: 5/17/2002 6:22:35 PM
IRRINET: Pack transactions
IRRINET-XL: Check set calls (status = 0)
IRRINET-XL1: Field Unit: IRRInet-XL
IRRINET-XL2:
IRRINET-XL3:
IRRINET-XL4:
IRRINET-XL5:
IRRINET-XL6:
IRRINET-XL7:
IRRINET-XL8:
IRRINET-XL9:
Actions:
5/17/2002 3:23:55 PM.087 Open DBMAP Channel 1 Ptr 3113696
5/17/2002 3:23:55 PM.638 Open DBMAP Channel 2 Ptr 3125864
5/17/2002 3:23:55 PM.648 Open DBMAP Channel 3 Ptr 3135504
5/17/2002 3:23:55 PM.648 Open DBMAP Channel 4 Ptr 45088840
5/17/2002 3:23:55 PM.658 Open DBMAP Channel 5 Ptr 45099136
5/17/2002 3:23:55 PM.668 Open DBMAP Channel 6 Ptr 45109552
5/17/2002 3:23:55 PM.678 Open DBMAP Channel 7 Ptr 45119968
Description
Receive Time
User login in ICC
IRRInet control center start 5/17/2002 3:23:37 PM None 5/17/2002 3:23:37 PM
User login in ICC 5/17/2002 9:59:44 AM None 5/17/2002 9:59:44 AM
IRRInet control center start 5/17/2002 9:52:17 AM None 5/17/2002 9:52:17 AM
MANUAL ICC 2 100 % INS CAPS NUM 6:22 PM 5/17/2002

communication server tasks.

The two "light bulbs" shown here are the icon that indicates the status of one or more of the servers. Double click (or press the [F12] key on your keyboard) on this icon and the popup window shown above will allow you to set up any one or the entire eight task servers.

Note that each task must be setup and the "Active" box checked for that task to be functional. If you want to see the status of in any one of the active servers, double click on the "light bulbs" icon and select the appropriate tab in this popup screen.

At minimum, you must activate the FIU tab for communication to the field units.

After Activating the FIU, click on each individual tab and "ONLY" activate servers that you are using.

The choices are:

Pager: To send events to Pagers or cell phones.

DTMF: Also known as DTMF One Way communication.

DTMF Voice: Also known at DTMF Two Way communication.

Accumulation: To calculate the amount of water used by a valve or a group of valves.

Net Protect: To set up Deviation and line protection.

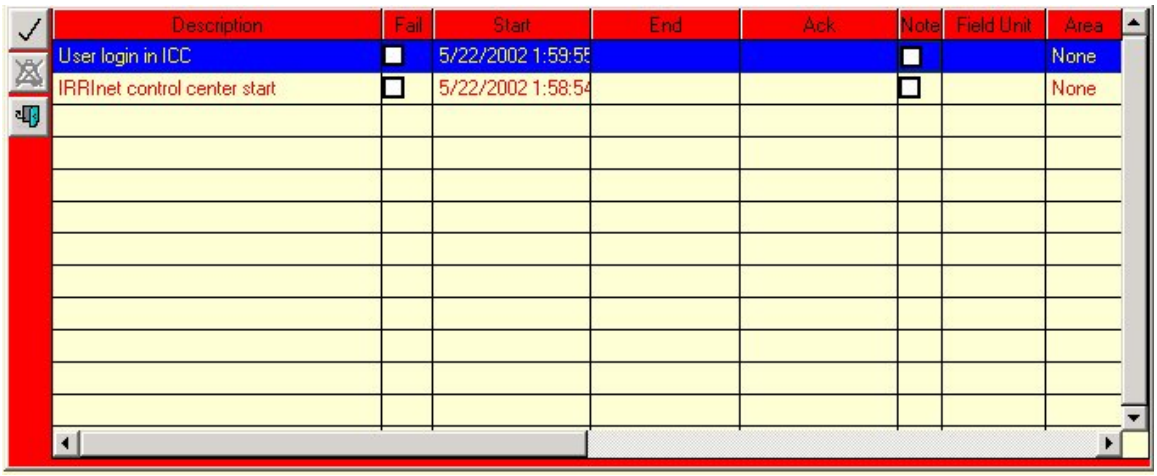
Commands: To allow communication of commands with the field units.

Weather. To activate the weather station activate this server.

Acknowledging Events:

When an event pops up on the screen it is to tell the user of a change in the status of the application. Events need to be acknowledged, when a message pops up, after investigating the cause of the event you may clear the event by clicking on the check mark.

You may click on the exit sign to close this window without acknowledging the events. However you will have to come back later and acknowledge these events. Do not use the ESC key, always choose to either acknowledge an event or exit to



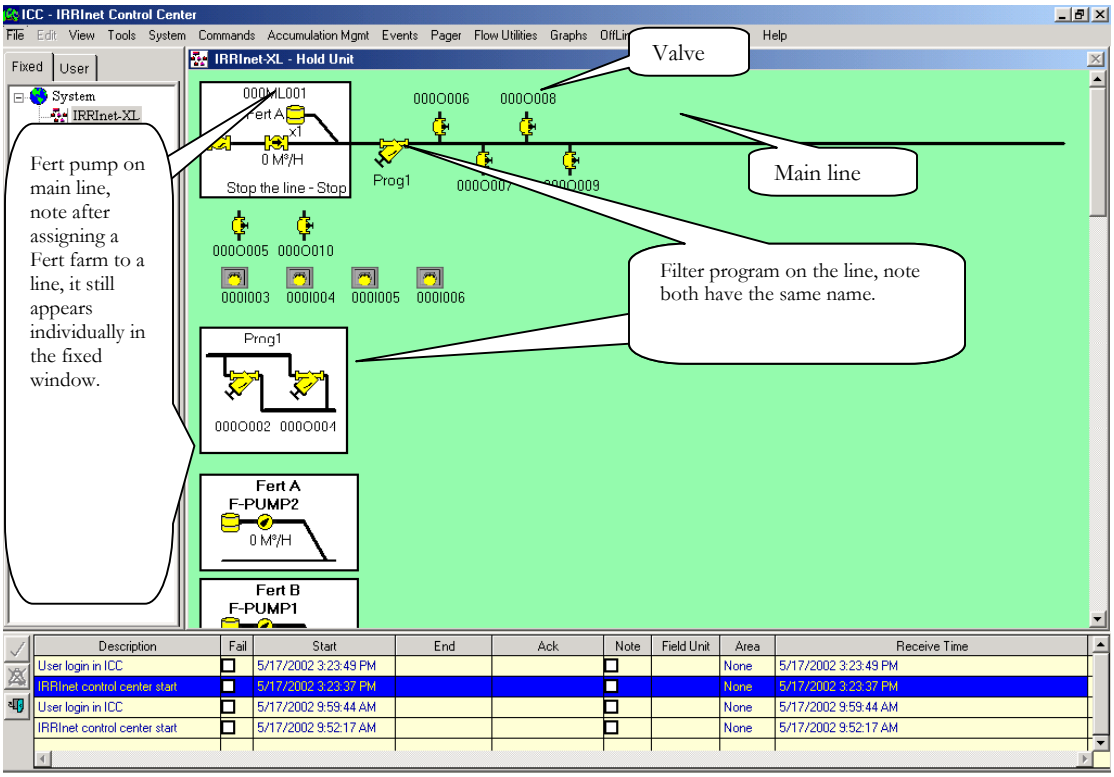
acknowledge later.

You may later bring up this window again by double clicking on the located on the system tray.

***Note:** You can right-click on the check mark, which opens up a dialogue box allowing you to acknowledge all the events in the list, left-click on the popup to acknowledge all events in the new events popup.

Fixed Graphics View:

The fixed screen shows the order and format of mainlines, with their valves, meter, main valves, filters, fertilizers and other free I/O's that may not be


ICC - IRRInet Control Center
File Edit View Tools System Commands Accumulation Mgmt Events Pager Flow Utilities Graphs OffLine Help
IRRInet-XL - Hold Unit
Fixed
User
System
IRRInet-XL
Valve
Main line
Fert pump on main line, note after assigning a Fert farm to a line, it still appears individually in the fixed window.
Filter program on the line, note both have the same name.
Fert A
F-PUMP2
0 M³/H
Fert B
F-PUMP1
Prog1
Stop the line - Stop
Description
Fail
Start
End
Ack
Note
Field Unit
Area
Receive Time
User login in ICC 5/17/2002 3:23:49 PM None 5/17/2002 3:23:49 PM
IRRInet control center start 5/17/2002 3:23:37 PM None 5/17/2002 3:23:37 PM
User login in ICC 5/17/2002 9:59:44 AM None 5/17/2002 9:59:44 AM
IRRInet control center start 5/17/2002 9:52:17 AM None 5/17/2002 9:52:17 AM

attached to lines. This is a graphical version of all that we have done up to now.

Right Mouse Button Activity

From this view, you can move the mouse to point at any element in the graphic window and click the right mouse button to pop up a choice of actions.

Right Click on an Output

Select from:

Open (manual control, including a duration to hold open)

Sample now (interrogate for status, note sampling a valve samples all the valves on the RTU)

Start Line (puts Main Line into RUN)

Reset alarm (if there was a flow related alarm on this output, reset clears the alarm)

-Or-

Stop Line (puts Main Line into STOP)

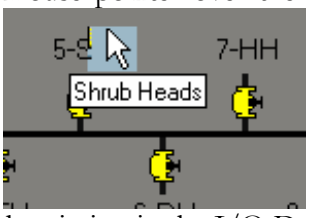
View Programs--shows all programs from this field unit

Define Point--edit setup data about this output

Info--display data about this output.

Tool Tip on Output Label

Place the mouse pointer over the label or name of any output. If you have



entered a description in the I/O Definition of this output, you will see a tool tip pop open showing the description. Note that this only works when you place the mouse pointer over the name or label. The same feature exists for the main line label and for input labels.

Having just completed the "Initial Data Entry" for each field unit, you may ask "what about the rest of the menu items?

COMMANDS:

From the main menu choose Commands and then click on "Commands Programs".

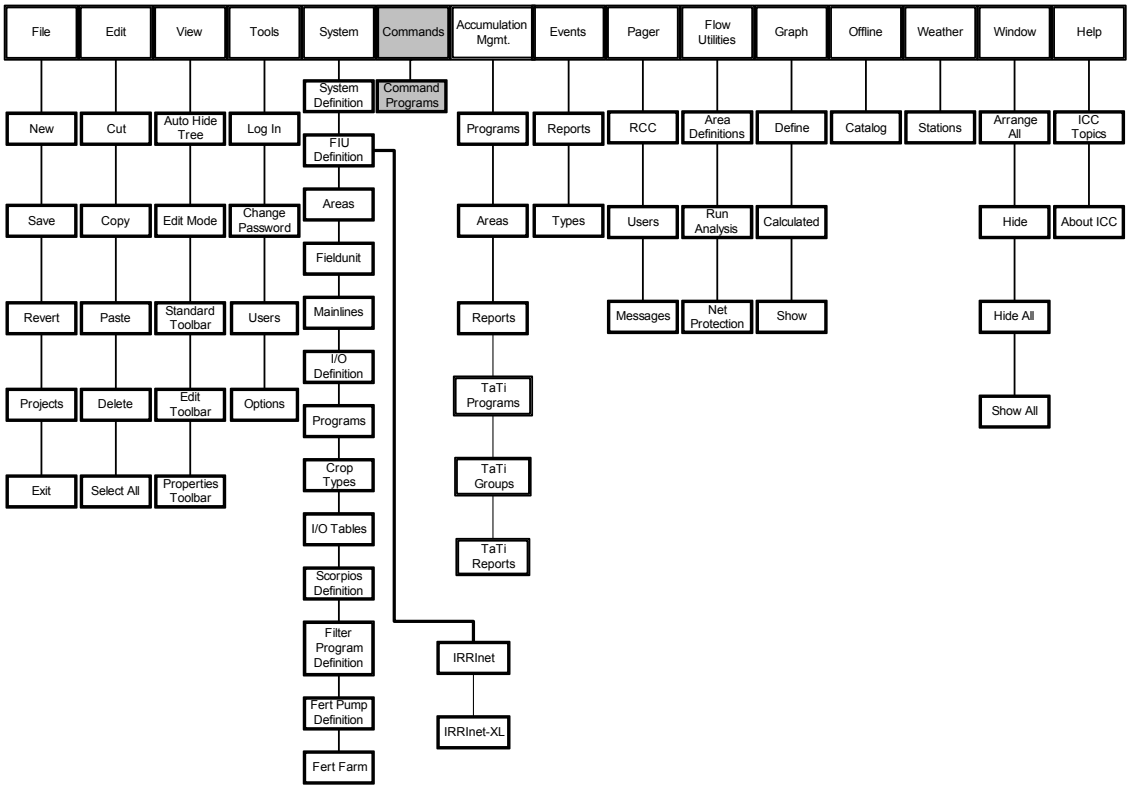
What is a Command?

A command program is a program that resides on your computer hard-drive and gets executed when the preset conditions for it are met.

Ha!!!

A condition is a program just like the ones you use for writing programs for your valves. With one major difference, the commands reside on your local hard-drive and are not sent to the field units. A command will only be sent to a field unit when the conditions for that command are met.

IRRInet Control Center… 13.X



For example:

Let's assume you have a parade going through Main Street every 4th of July, and you want to stop all that irrigation on that street on the third. (So people don't walk in mud)

1. You have a couple of options:

2. You can stop that line manually.

3. You can disable that program line.

4. Write a command that will stop the irrigation on that line on 3rd of July and don't worry about forgetting to do option 1 or 2.

There are something's you need to know before we go on. First let us answer this question:

What is the difference between "IF" & "IF AND ONLY IF"?

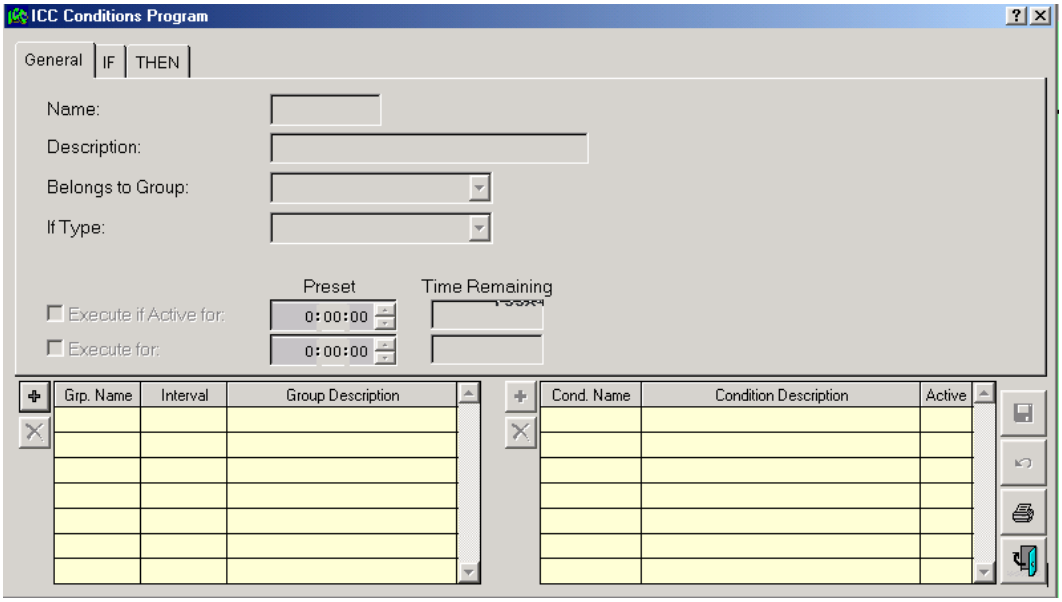
The word "IF" is a condition that is executed alone. For example: "IF valve 1 is open, then open valve 601". When this requirement is met, the condition will end. However, if you want valve 601 to close you will then need another condition stating, "IF valve 1 is closed, then close valve 601.

However: In programming when you use "IF AND ONLY IF" it means only when this condition exists. For example: "IF AND ONLY IF valve 1 is open, then open valve 601". For IF AND ONLY IF you don't need to use another condition to close the valve. Because when valve 1 closes the valve 601 will close also, since the condition IF AND ONLY IF is no longer met.

Now that we understand this concept lets look at a condition.

Click on "COMMANDS" on the menu bar and choose "COMMAND PROGRAMS"

A new window opens that looks like this…



First we have to add a **group** by clicking on the plus sign of the group option.

GRP. Name: Give the Group a name. For our purposes we are going to give it the name of "The 4th"

Interval: Is used for the time for the system to check to see if the condition is being met. If you are using a condition that requires ICC to pull data from the Field the interval should be set accordingly. For our purposes checking every 12 hours should be sufficient.

Note:

Pay attention to what you are using this condition for, for example, if you are checking a rain bucket you may not want to set the "Interval: for every 10 minutes, this can cause high traffic on your radio and there is a good chance that your weather is not changing every 10 minutes. (Unless if you live in Chicago)

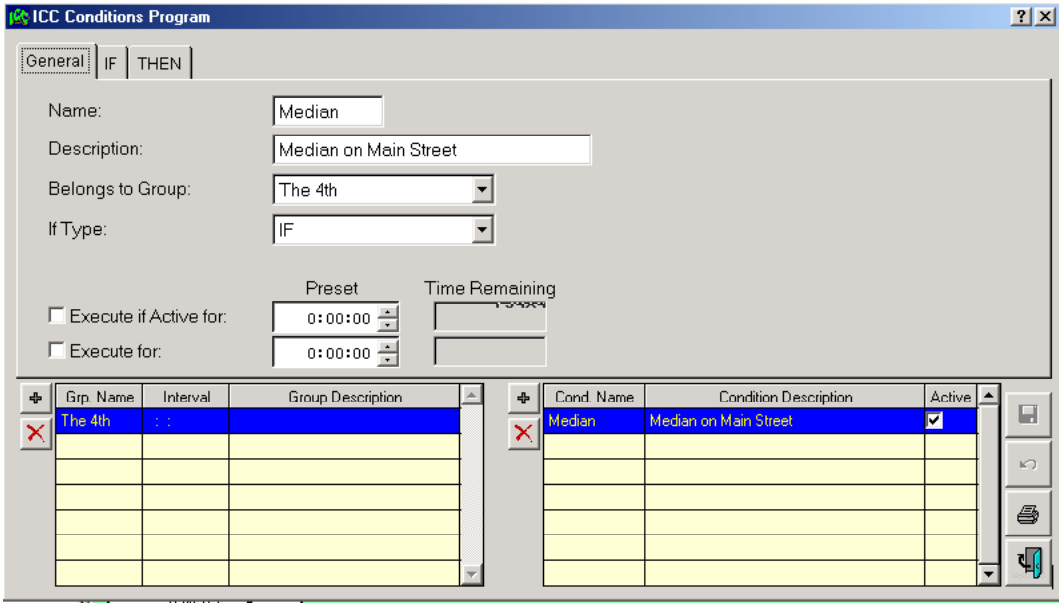
Group Description: This area will allow you to put a more detailed description of the condition. For our purposes we are going to fill in this area "4th of July Irrigation".

You have now setup your first group.

Now we need to setup a condition for this group. Remember that you can setup more than one condition for a group.

Click on the plus (+) sign by the "Cond. Name"

Type in a Name and a description for this condition and from the "Belong to Group" Pick the group you want this function to belong to. In our case it would be "The 4th"



There are two other areas that you need to think about on this screen.

- ***Execute if Active for:*** You can set up a delay here. If your condition is met, you can have the execution be delayed.

For example: You can set up your delay of if a rain sensor is activated wait for 3 hours before stopping the irrigation on Main Street.

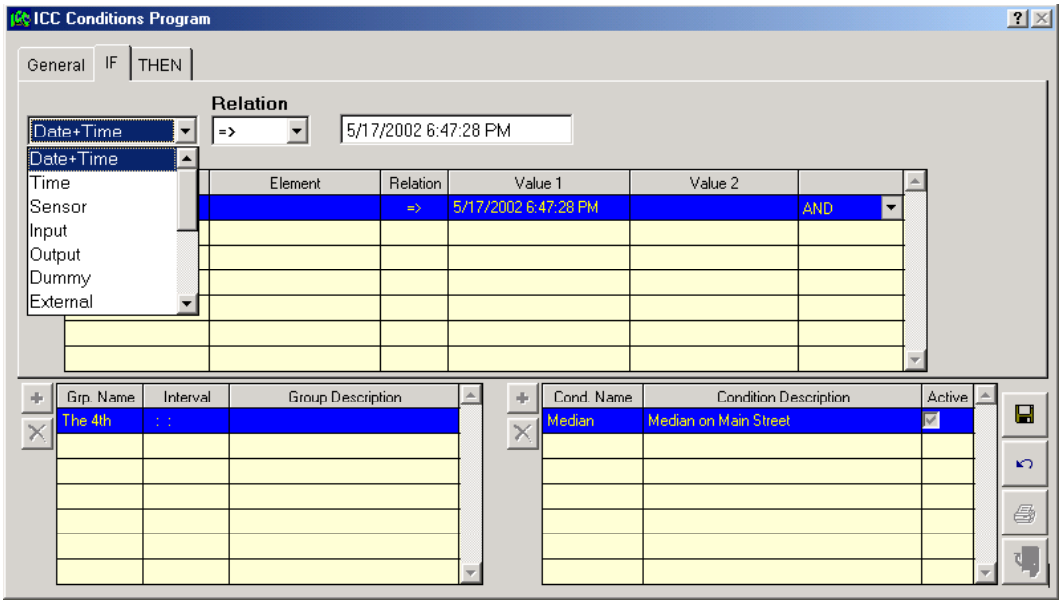
- ***Execute for:*** Time you want the command to be active for.

For example: You can set up your delay to execute for 24 hours. After a rain sensor is activated.

Here you will choose your IF or IF AND ONLY IF statement.

Click on the "**IF**" tab and let's continue on setting the conditions.

IF Tab:

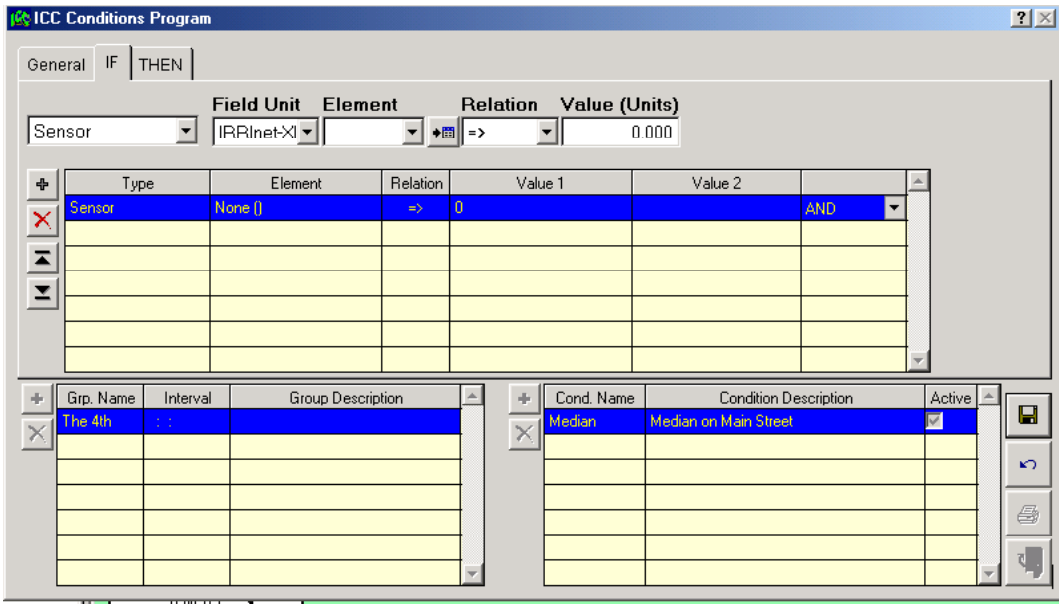


Click on the "+" to add a new IF condition a new row of options appears. From the options choose the IF statement. You have the following options. Table of Commands Available:

IF Command	**Definition**		
Date + Time	Select specific calendar date and time of day. Also can select range of dates.		
Time	Select time of day (this variable would be true every day as there is no calendar day reference).		
Sensor	Usually an analog input type sensor like pressure or level.		
Input	A digital input, on or off, like a level switch.		
Output	Any valve or pump or other control.		
Internal	"Dummy" stations or Dummy Condition series numbers used as a valve entry in a program in a field unit.		
External	External Condition series conditions sent from the central to the field units.		
Logic Condition	A field unit "command program" that supports testing of multiple variables.		
Net Protect	Refers to Network Protection that can be used to monitor a water distribution pipeline.		
Flow	Testing against a flow measured by a flow meter.		
Event	Select from any of the events that can log into the history database.		
Astronomic Clock	Test for time compared to sunrise or sunset.		
Calculated Value	You can set up a calculated value (see Graphs) that can be tested for its value.		
Element Status	Test any input or output for being "OK" or in fault.		

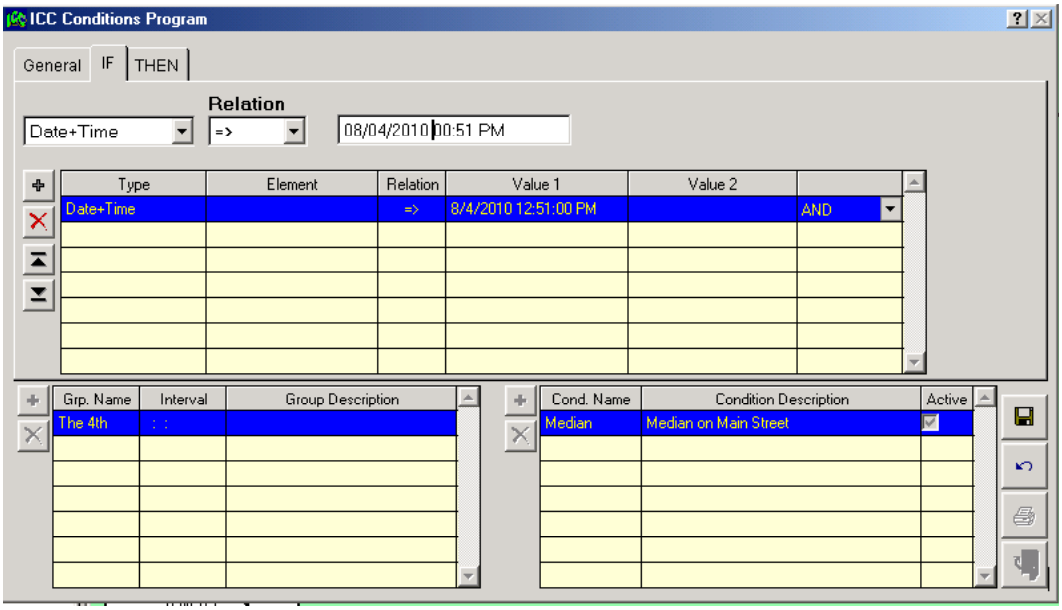
Please note that depending to the "type" you pick you will get more relative fields that you have to fill.

For example: If you choose your "Type" to be a "Sensor",

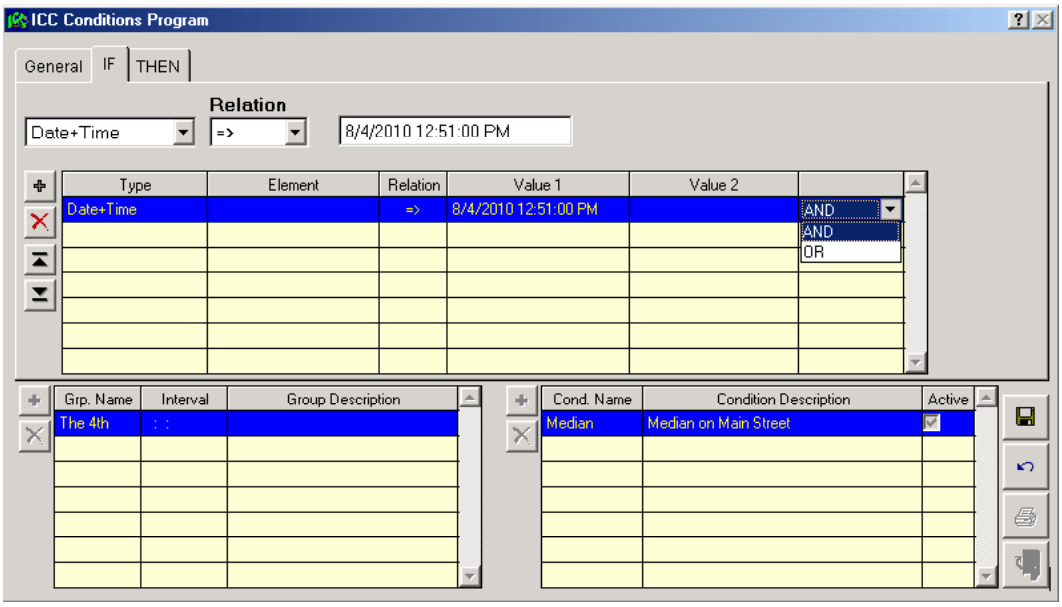


Here you will get the related fields to that "sensor" Where you have to choose the "Field Unit", "Element", "Relation" (=, =>, <=, ….) and "Value".

Another example is time, here a Date+Time is chosen to be equal to or greater than July 4th 2010 00:00:51 PM



After Choosing your "Type" and it's corresponding Element you have to choose one other option before moving to the next tab, AND; OR.



AND, OR: You can have more than one "If".

For example, you may have *IF* it's 3rd of July or *IF* the sensor on Main Street is activated do not irrigate. To do this you choose your first "TYPE" then after filling all it's relating fields choose either AND, OR and create your next TYPE".

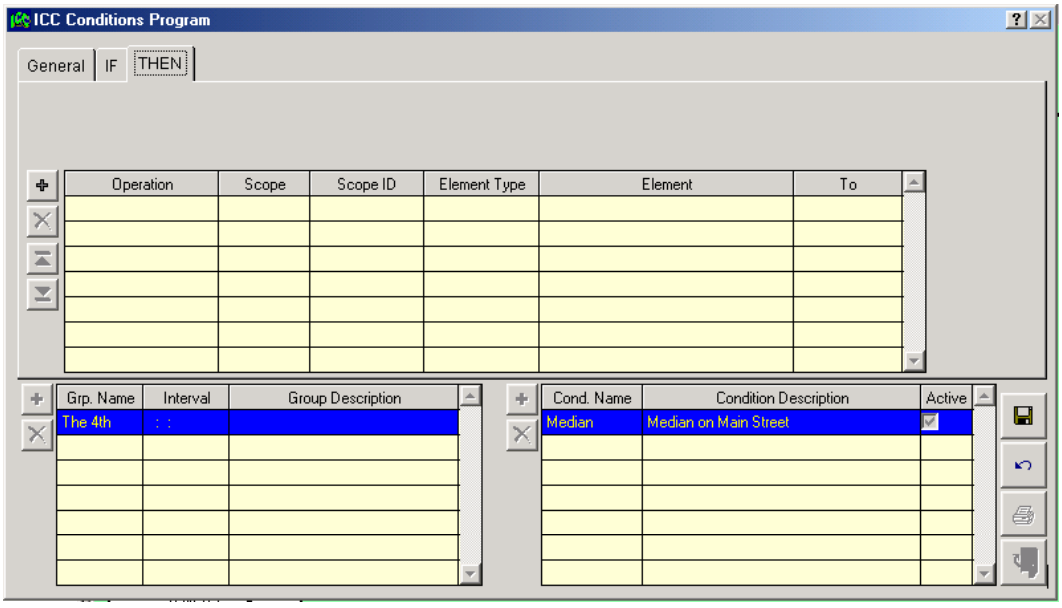
Priority Arrows: If you Choose "AND" or "OR" you may give one "TYPE" priority over the other, by choosing the priority arrows to move a type higher or lower on the table.

Short Review:

We created a group and for that group we are in the midst of creating our first condition. A condition is made of two parts; IF a condition is met THEN respond by doing something.

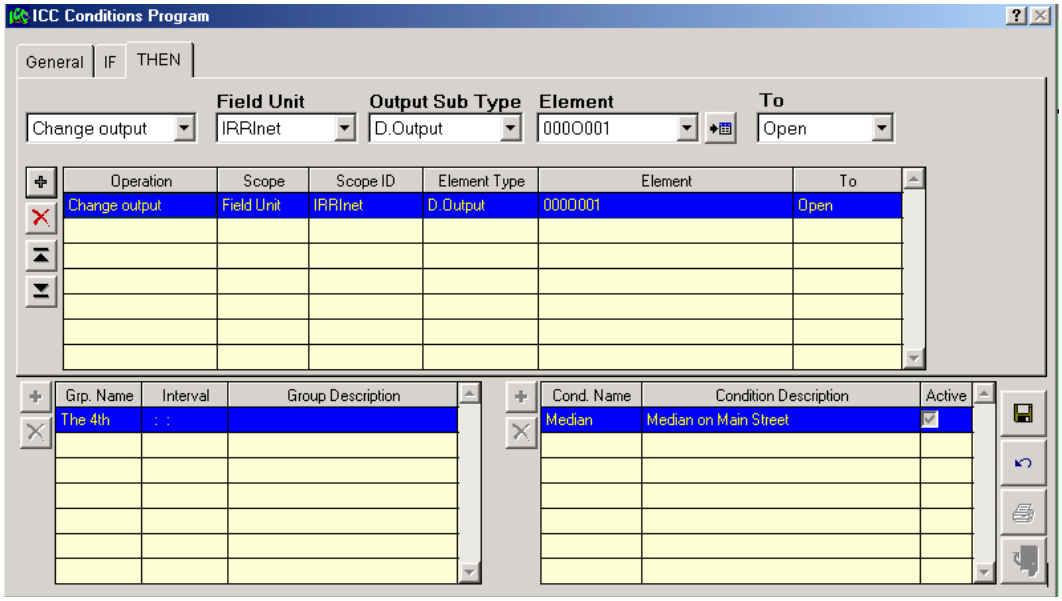
We are now to the part where we move to THEN do something!!!

THEN Tab:



Click on the "**THEN**" tab.

To add a "**THEN**" function click on the Plus (+) sign.



A Menu line appears with some options similar to the IF function

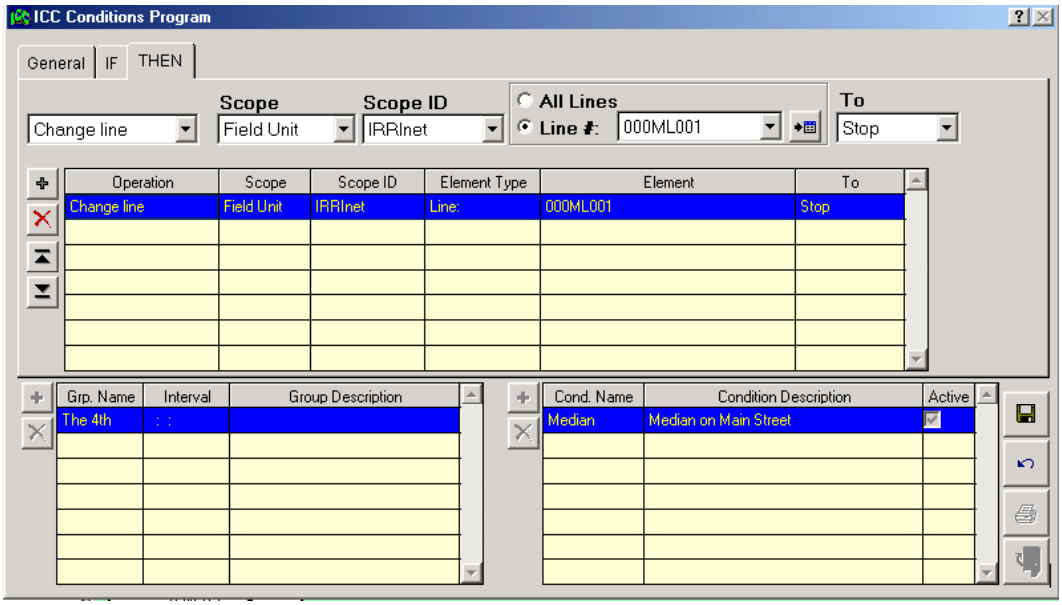
Within this menu the first table is called Operation:

Operation: Is the actual "THEN COMMAND" this is where you pick what will want done after the IF function is met. There are 6 options to choose from. They are listed in the table bellow.

THEN Command	**Definition**
Change Output	Turn on or off an output, which could be a valve, pump, or other control.
Change External	Change the external condition (External Condition's) (on or off)
Change Line	Change the main line to run or stop.
Set Value	Change the percentage factor for Low Flow, High Flow, or ET Water Factor.
Load Programs	Schedule to automatic downloading of offline catalog programs.
Set Event	If the variables are true in the IF, then log an event to the history database. You can create your own custom event messages.

In continuation of our example we chose an IF function, if 3rd of July is met, THEN put the main street line to stop mode.

So let's choose "CHANGE LINE" from the "THEN COMMANDS"



First we choose the Change line option and from "**Scope**" pick the "**Field Unit**" option.

As soon as you click on the "**Field Unit**" Table appears called "**Scope ID**" where you have to choose the Field Unit where Main Street is located. Then another Table will pop up where you can either choose to stop all lines on this field unit or choose a line from the drop down menu. Here we will choose just the Line # and pull down the menu where we pick Main St. and the option "**To**" to "**Stop**"

Click on **Save.** You have now setup your first command. You can active or deactivate this command as you please by just clicking in the "**Active**" box in the "**General**" tab. This option will allow you not to have to delete a command, you can store as many commands as you like on your hard drive and comeback to them, as you need them.

Note: Remember that you have just created an IF command, which means that the mainline is in stop mode till you change it back to ON manually. Or write another command that start the line.

Note:

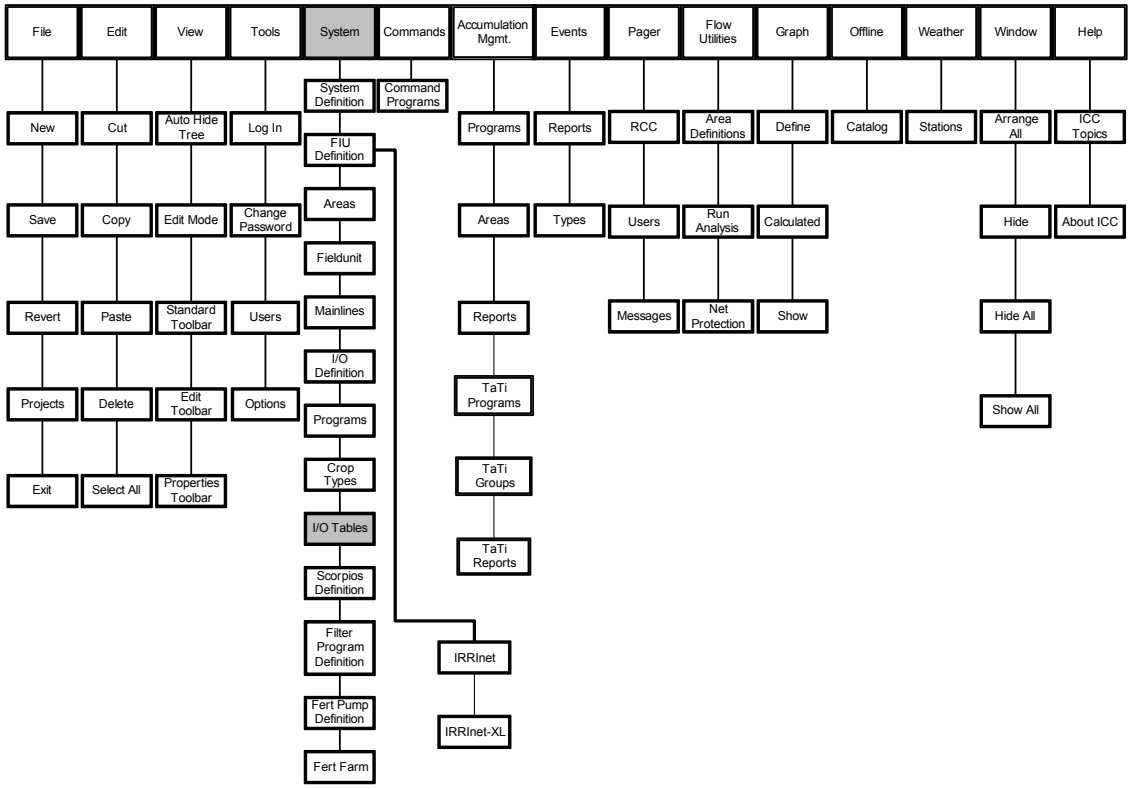
Please remember that Commands are stored on your hard drive not in the Field Units. If ICC is shut down or the FIU Server is not active this command will never be sent to the field.

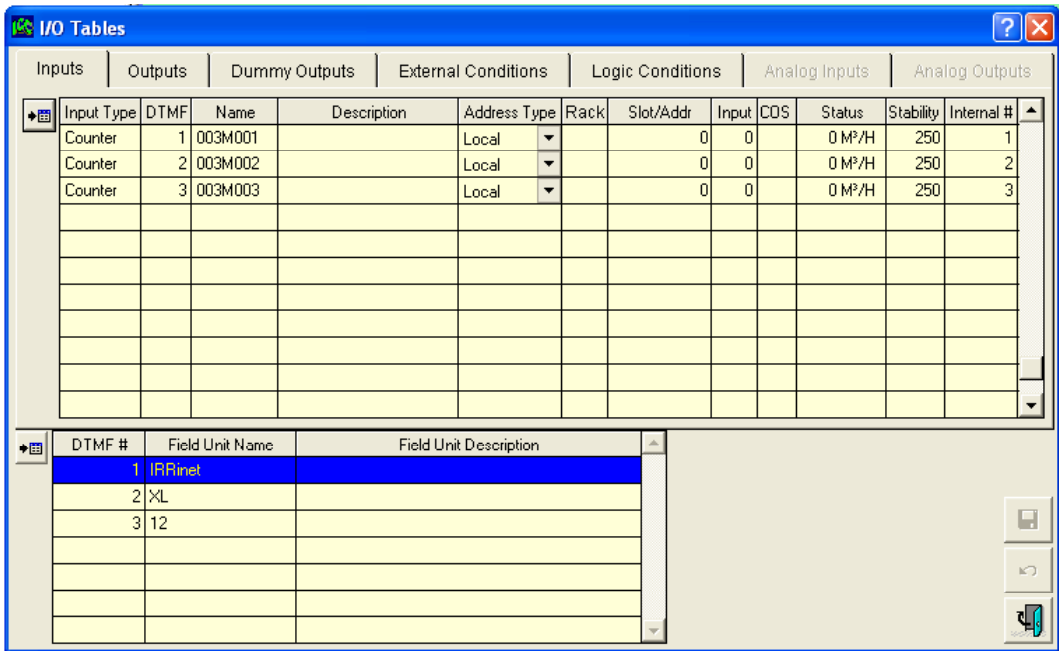
I/O Tables:

This table display of Output Counters in I/O Tables and some analogue options, even though you can not add or remove I/O's from this window, it is one of the most useful windows within ICC.

This Table is one of the most useful windows in ICC and you will see yourself visiting it often. Here you will see the list of all the inputs, outputs, Dummy Outputs, External Conditions and Logic conditions for each field unit in one table.

IRRInet Control Center… 13.X




I/O Tables
Inputs
Outputs
Dummy Outputs
External Conditions
Logic Conditions
Analog Inputs
Analog Outputs
Input Type | DTMF | Name | Description | Address Type | Rack | Slot/Addr | Input | COS | Status | Stability | Internal #
Counter | 1 | 003M001 | Local | 0 | 0 | 0 M³/H | 250 | 1
Counter | 2 | 003M002 | Local | 0 | 0 | 0 M³/H | 250 | 2
Counter | 3 | 003M003 | Local | 0 | 0 | 0 M³/H | 250 | 3
DTMF # | Field Unit Name | Field Unit Description
1 | IRRinet
2 | XL
3 | 12

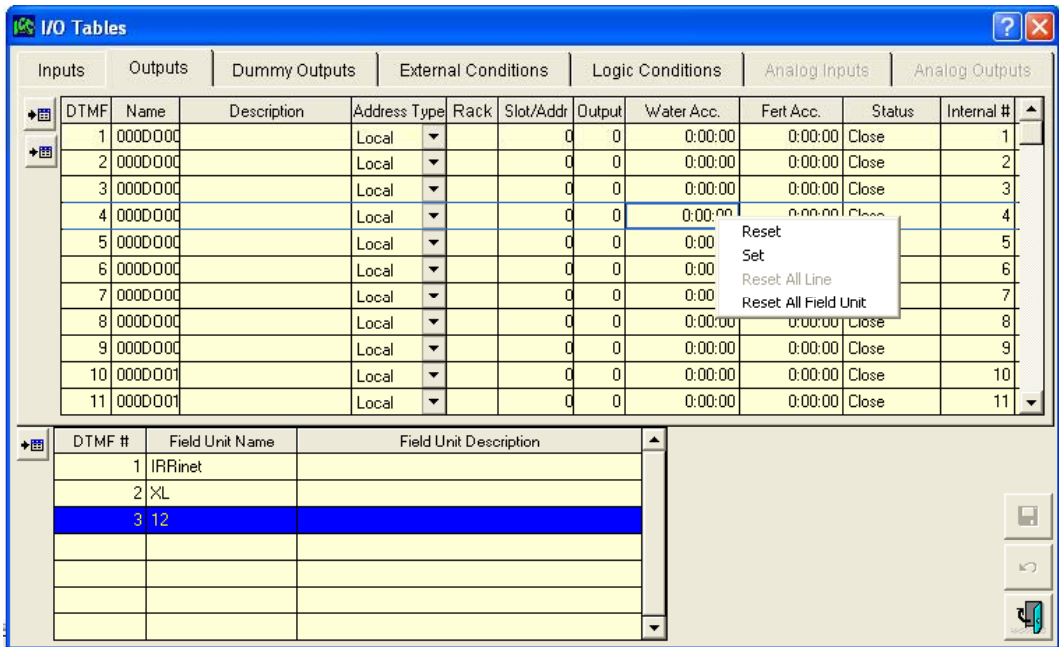
Inputs Tab:

This Tables will display the DTMF number, Name, Description and most importantly the physical Connections and allows you to make some changes.

Address Type and Slot/Address: Previously in the I/O definition table we described the physical connection of each I/O here you may view them and modify them by using the drop down menus each column.

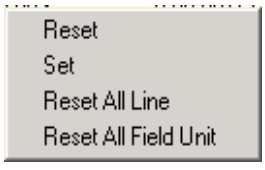
Status: This Column will display the current status of this I/O.

Output Tab:



Just like the input window this window will display the Physical Connections. However the most important column in this window is the "Water Acc." and "Fert. Acc". This column displays the current amount of water used by this output in either Time or Quantity based on your accumulation method. You may manipulate these accumulations by right clicking on a field and choosing one of the 4 options in the drop down menu.

- **Reset:** Will reset the field to 0.
- **Set:** Will allow you to set the field to a custom accumulation, from here on the new accumulation will be added to this value.
- **Reset all line:** Will reset all the outputs and inputs on the line this output is attached to, to 0.
- **Reset All Field Unit:** Will reset all outputs and input accumulation values on this field unit to 0.



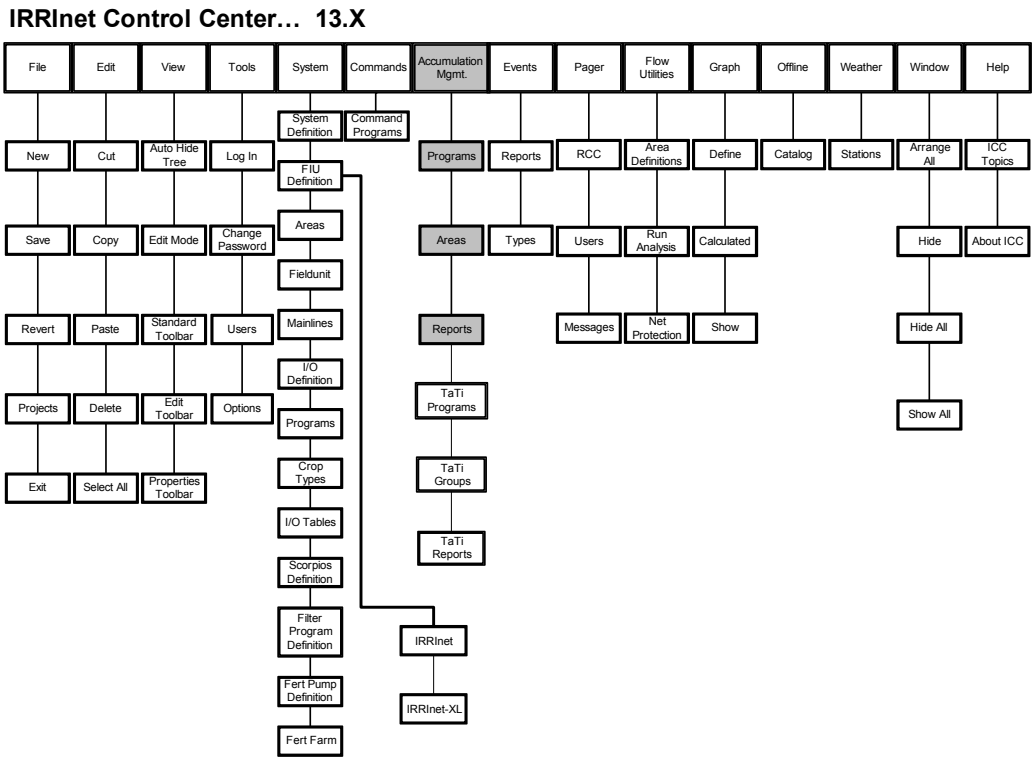
Accumulation Programs:

The accumulation management functions in the ICC software rely on data collected and stored in the field units' (IRRInet and "F" units) cumulative data tables.

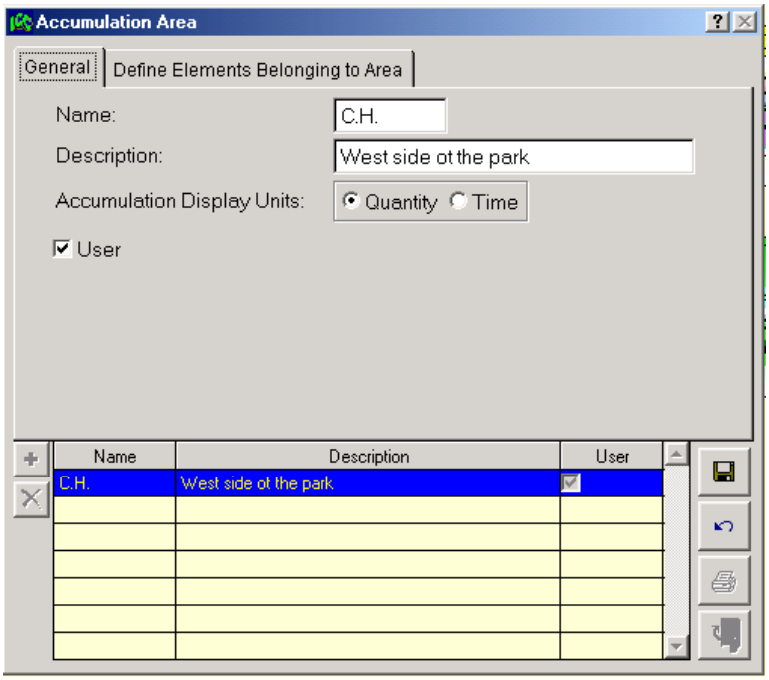
This feature allows you to group together outputs and main valve accumulated time/quantity values collected from the field units' Cumulative Data table.

Even though the programs are first on the drop down list of Accumulation Mgmt. Lets start from the second option Areas:

To start from the main menu choose "Accumulation Mgmt" and click on "Areas".



Areas (Accumulation):



Click on the "+" to add a new area

Type in the description for this accumulation Area.

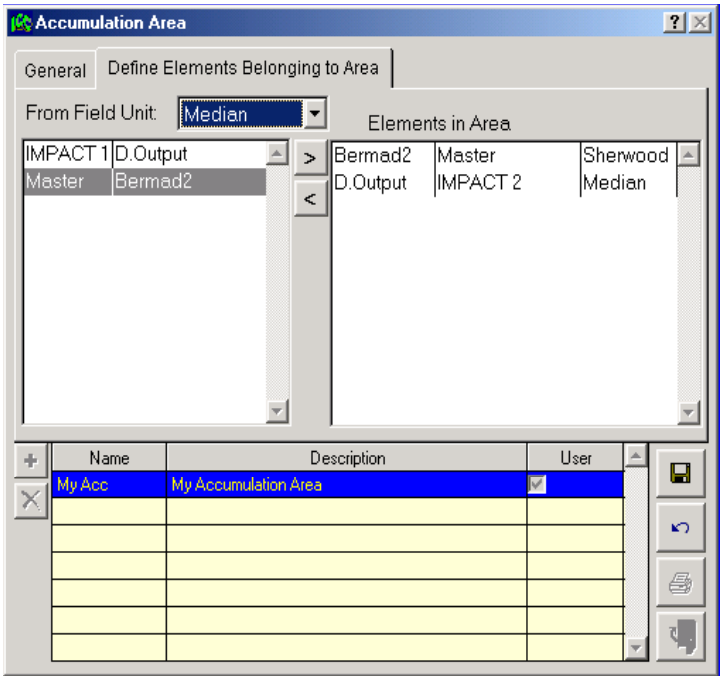
Accumulation Display Unit: Choose either "Quantity" if you are accumulating based on volume or "Time" if you are accumulating based on time.

User: Choose User if the accumulation is going to be user specific and only the creator of the Accumulation Areas should have the right to view.

Define Elements Belonging to Area:

Using this tab, the operator will be able to add elements to this custom Accumulation Area. Later you will be able to import this Area as one object into the programs, lets take this step by step.

Define Elements Belonging to Area: (continued)



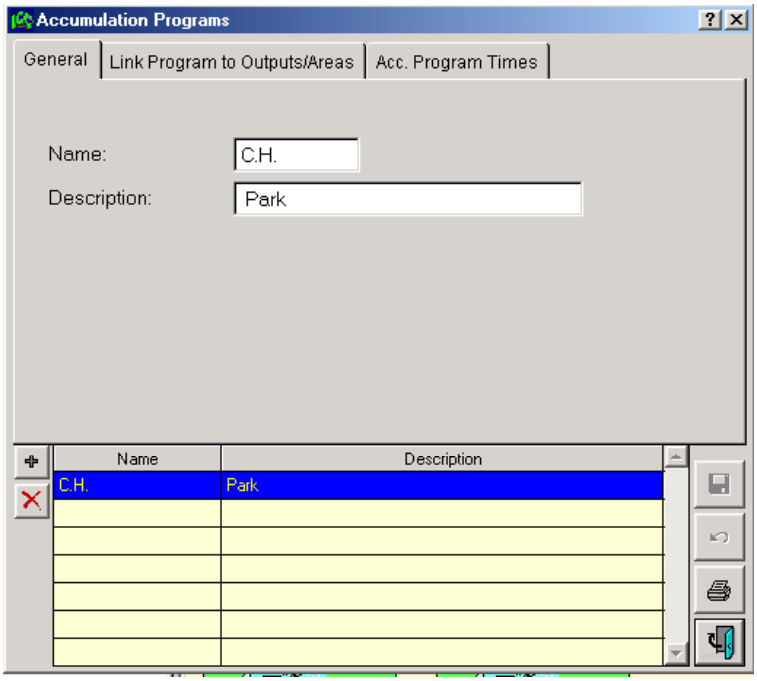
As you can observe you are able to add elements from multiple field units. Here we have chosen to add a valve from the field unit Sherwood and the other from Median.

Once finished with your selection simply click Save and exit this screen.

To write an Accumulation Program, from the main menu choose Accumulation and click on Programs. A new window opens.

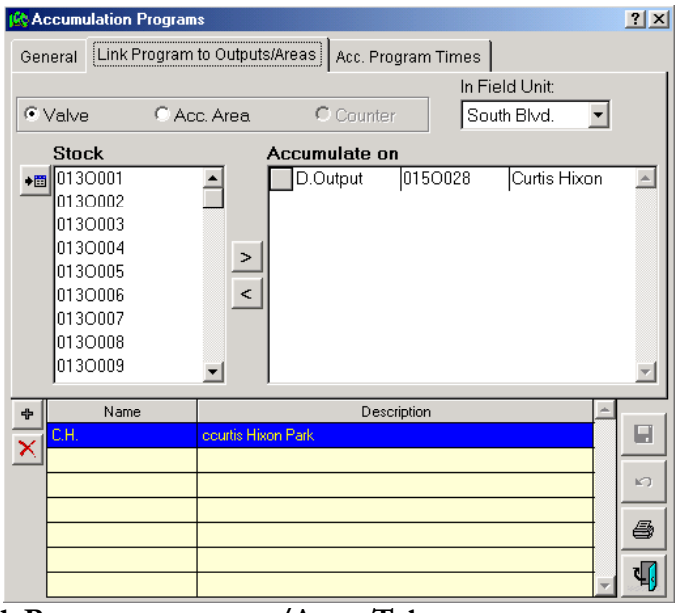
Accumulation Programs:

General Tab:



First step is to create the first "program" (above). Each program can have a different day-frequency and time(s) of day when interrogation for cumulative data in the field units is performed.

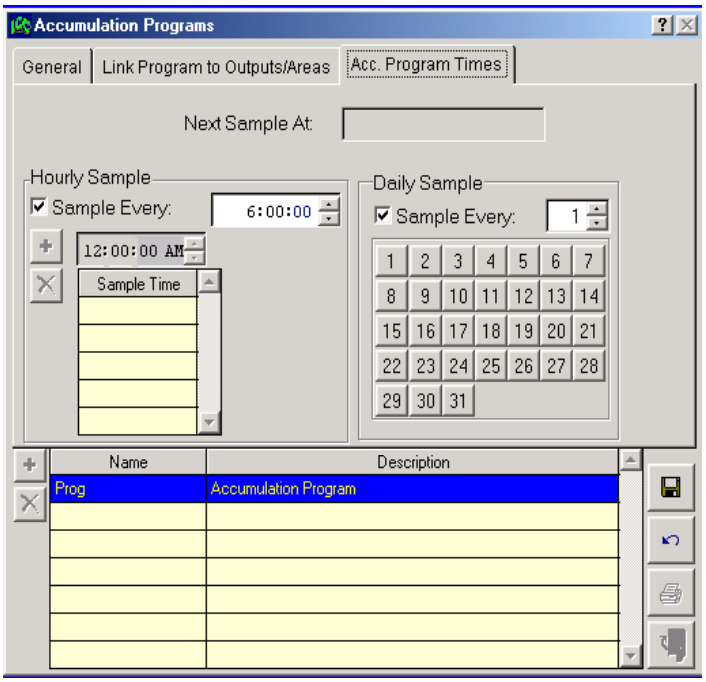
Type in the "Name" and "Description" of this program:



Link Program to outputs/Areas Tab:

To move over valves click on the valve and use the Arrows to move them one by one to the "Accumulation On" column. To move an "Accumulation Program" over, check the flag for "Acc. Area" and move the accumulation area over using the same arrows.

ACC. Program Times:



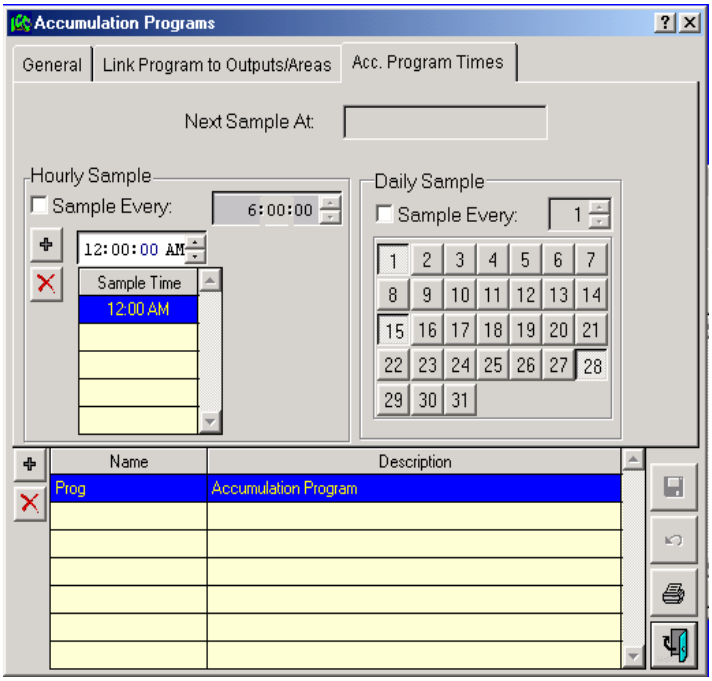
In this screen you will choose how often to call the field to collect accumulation. This screen is critical to users who may not have a large bandwidth or expensive communication media. The operator should call the field for accumulation as often as need to. "Usually once an irrigation program cycle"

NOTE: You do not need to pull accumulation for every valve of every mainline, and field unit. By default if a request goes out for Accumulation values on a mainline all the valves attached to that main line is also uploaded. To view them you may use the Print option and view each valve individually.

Next Sample At: Once clicked on save after entering all data needed this window will display the next time the set call will ask the field unit for update on accumulation program.

Sample Every: You may type in a set number of time of the day and choose form the Daily Sample column "Sample Every" number of days. In the top example we will sample every 6 hours in every day. This would be extremely over done and depending on the number of valves in this program could make our radio communication very busy.

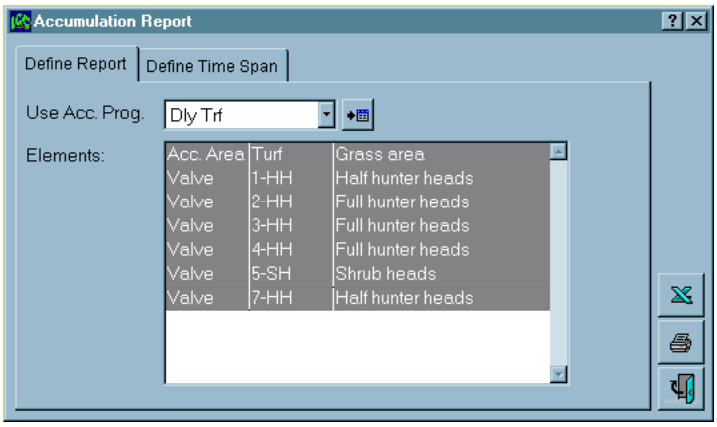
For other scheduling option uncheck the flag for Sample Every and using the + button add the exact time of the day, then uncheck the flag for "Sample Every" and check the exact days of the month.



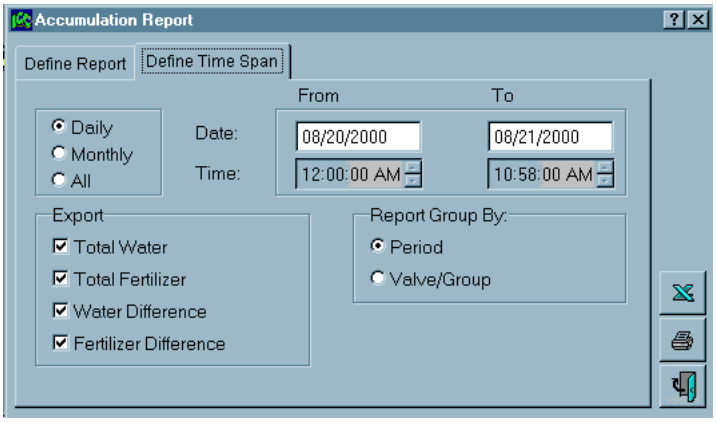
In the above option we have chosen to call for data from field units at 12:00 A.M on 1st, 15th and 28th of every month.

Accumulation Report:

Select Report from the Accumulation Mgmt main menu item. Here you can select the pre-defined accumulation program that will be used as the data source.



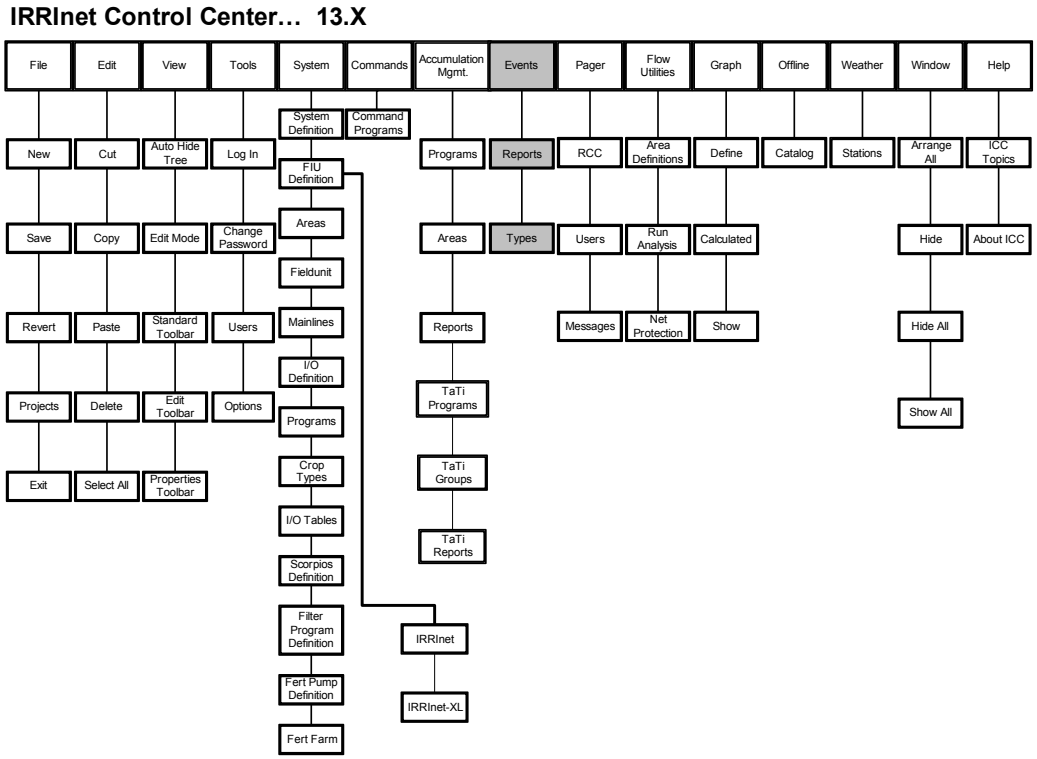
Next select the time span to report, then either export (Excel icon) or prepare for printing (Printer icon). Exported files will be found in the folder named **ICC - Irrigation Control Center**. Note that you can also select which items are reported. Selecting Water and Fertilizer Difference will result in a display of the elapsed totals between the accumulation records.



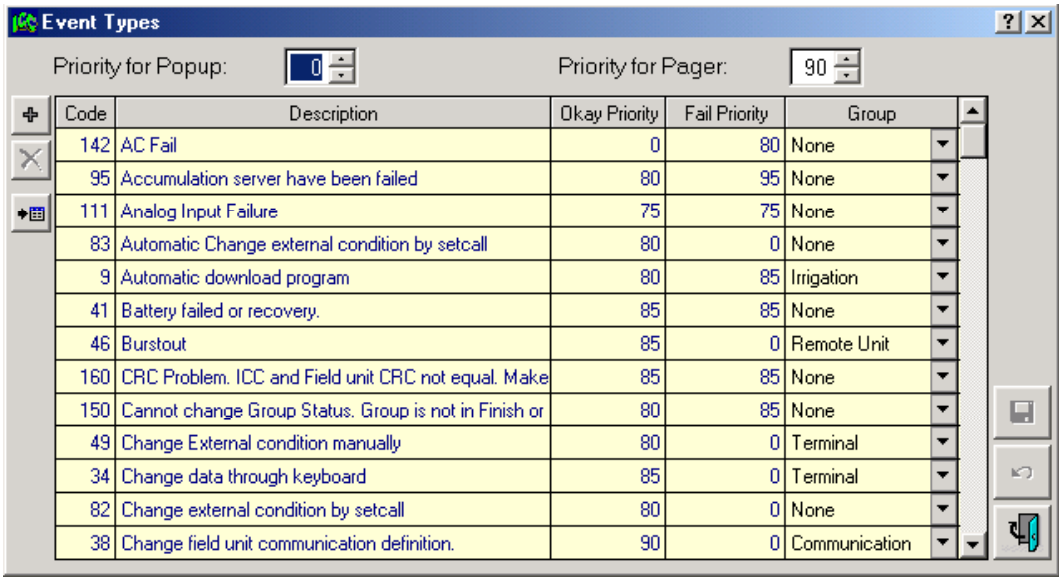
The report will group data for display either by period (e.g., daily) or by valve/group (e.g., all records for each valve/group displayed together). Select the appropriate "Report Group" according to your needs.

Events:

From the main menu click on the Events and choose "Types".



Event Types:

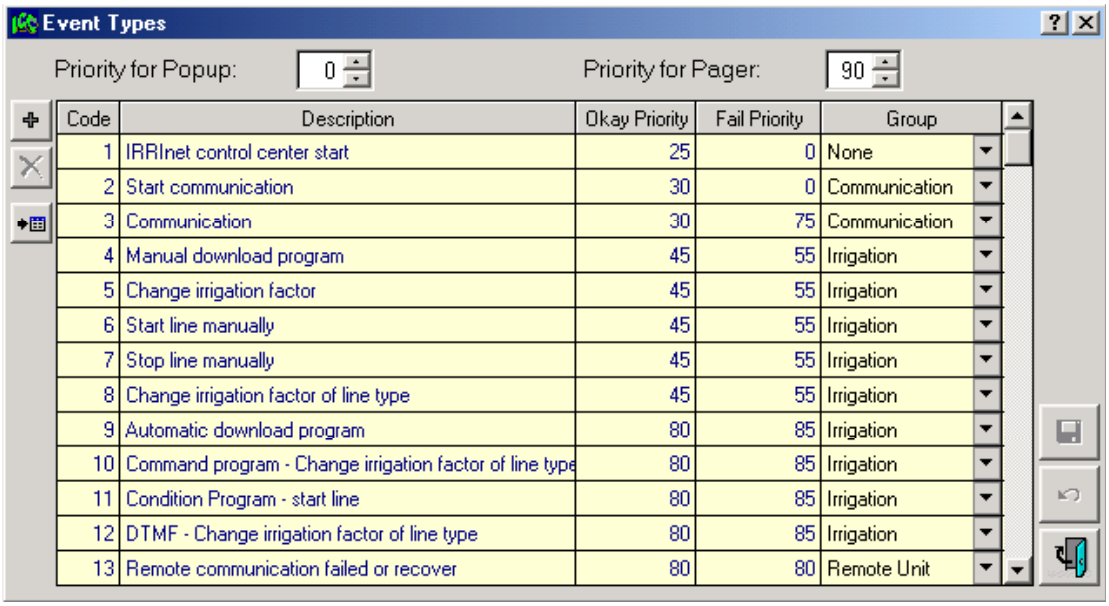

Event Types
Priority for Popup: 0
Priority for Pager: 90
Code
Description
Okay Priority
Fail Priority
Group
142 AC Fail 0 80 None
95 Accumulation server have been failed 80 95 None
111 Analog Input Failure 75 75 None
83 Automatic Change external condition by setcall 80 0 None
9 Automatic download program 80 85 Irrigation
41 Battery failed or recovery. 85 85 None
46 Burstout 85 0 Remote Unit
160 CRC Problem. ICC and Field unit CRC not equal. Make 85 85 None
150 Cannot change Group Status. Group is not in Finish or 80 85 None
49 Change External condition manually 80 0 Terminal
34 Change data through keyboard 85 0 Terminal
82 Change external condition by setcall 80 0 None
38 Change field unit communication definition. 90 0 Communication

Priority of Event popup: This option allows the operator to set priority for different types of Events. Any event set higher than this number will

Short Cut: You may reorder the list of the codes or alphabetize the Description by double clicking on the headers of each column.

Pager Priority: This option sets the priority for events that should be sent to the pagers. Any event set higher than this number will be sent VIA pager.

There are many ways to viewing a table here all the events are list from A to Z based on the description field, you may rearrange this list by assenting or descending code values by double clicking on the header code in the code column



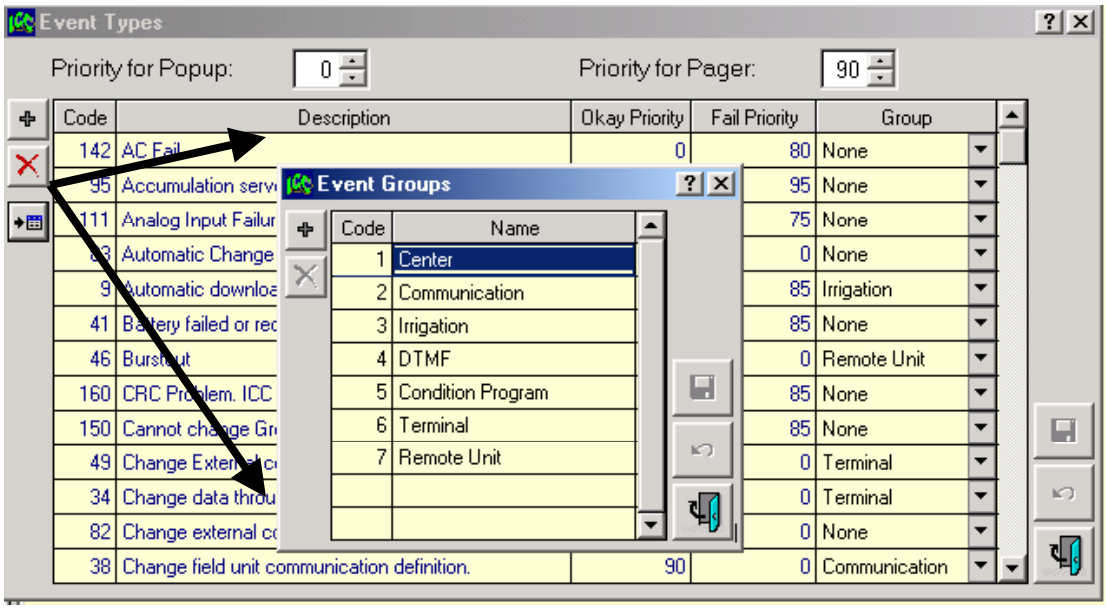
Code	Description	Okay Priority	Fail Priority	Group
1	IRRInet control center start	25	0	None
2	Start communication	30	0	Communication
3	Communication	30	75	Communication
4	Manual download program	45	55	Irrigation
5	Change irrigation factor	45	55	Irrigation
6	Start line manually	45	55	Irrigation
7	Stop line manually	45	55	Irrigation
8	Change irrigation factor of line type	45	55	Irrigation
9	Automatic download program	80	85	Irrigation
10	Command program - Change irrigation factor of line type	80	85	Irrigation
11	Condition Program - start line	80	85	Irrigation
12	DTMF - Change irrigation factor of line type	80	85	Irrigation
13	Remote communication failed or recover	80	80	Remote Unit

Your ICC software is configured with many events. An event is a message about some change of state in the ICC system. Messages may originate from the field, from the central hardware and from the central software operation. The Event Types screen allows you to set at what level certain "gates" in the software open; for example, the event popup window will only occurs when an event with a priority of 60 or higher occurs and an event with priority of 90 or higher will be sent to the paging system. You may change any event's "okay" (return to normal state) and "fail" priority so that one, both, or none of the states causes a popup and/or a page. Events may be assigned to groups that will be used later for reporting, and you can create your own groups.

Note: No mater what you set the priority at, for popup or pager, all events are logged.

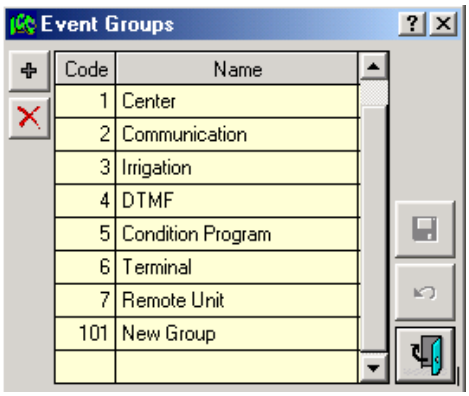
Event Group:

Event groups are designed to make it easier to print out event reports. You may print out an event report based on all the events that belong to a group.



Click on the table icon to table icon to open the "Event Group" window.

Click "+" to add a new group, and type in the name for the group once finished.

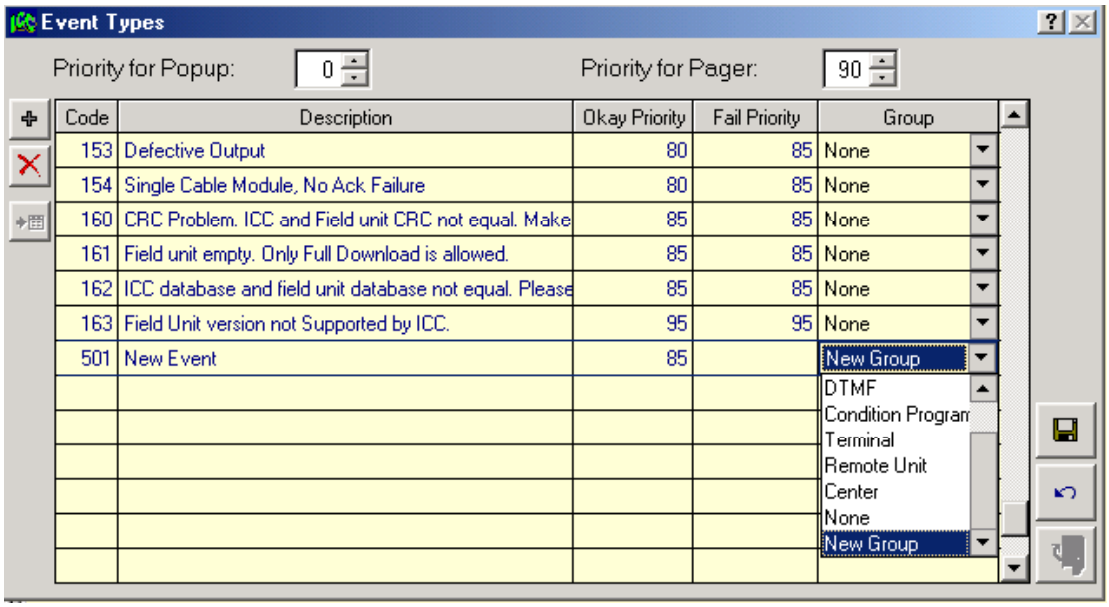


Notice" The new groups Code number is 101.

Click "Save", to return to the Events window.

Adding a new Event:

To add a new event in the Event Window click on the "+".


Event Types
Priority for Popup: 0
Priority for Pager: 90
Code
Description
Okay Priority
Fail Priority
Group
153 Defective Output 80 85 None
154 Single Cable Module, No Ack Failure 80 85 None
160 CRC Problem. ICC and Field unit CRC not equal. Make 85 85 None
161 Field unit empty. Only Full Download is allowed. 85 85 None
162 ICC database and field unit database not equal. Please 85 85 None
163 Field Unit version not Supported by ICC. 95 95 None
501 New Event 85 New Group
DTMF
Condition Program
Terminal
Remote Unit
Center
None
New Group

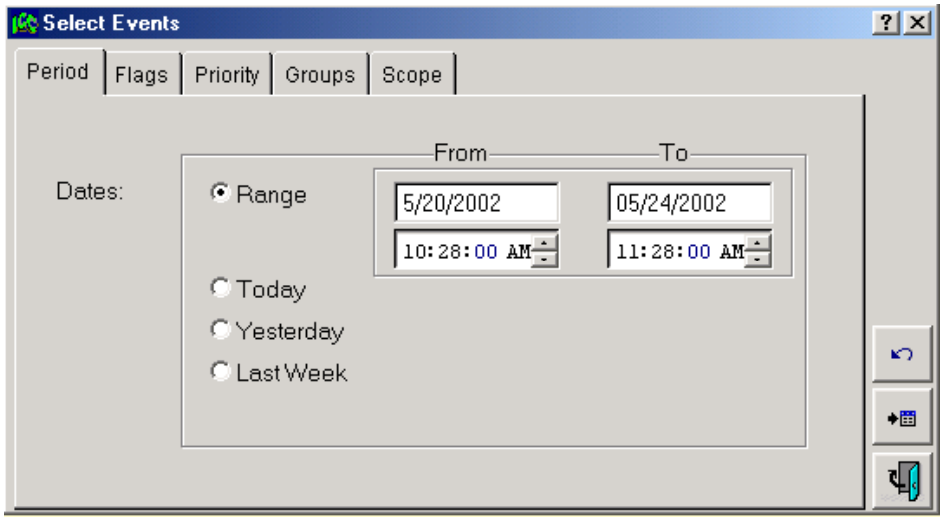
New events start from code 501, type in the Description of this Event and assign an "Okay Priority" number to the Event.

Choosing a Group: To assign this new event to a Group drop the group list by clicking on the down arrow and click on the group you desire.

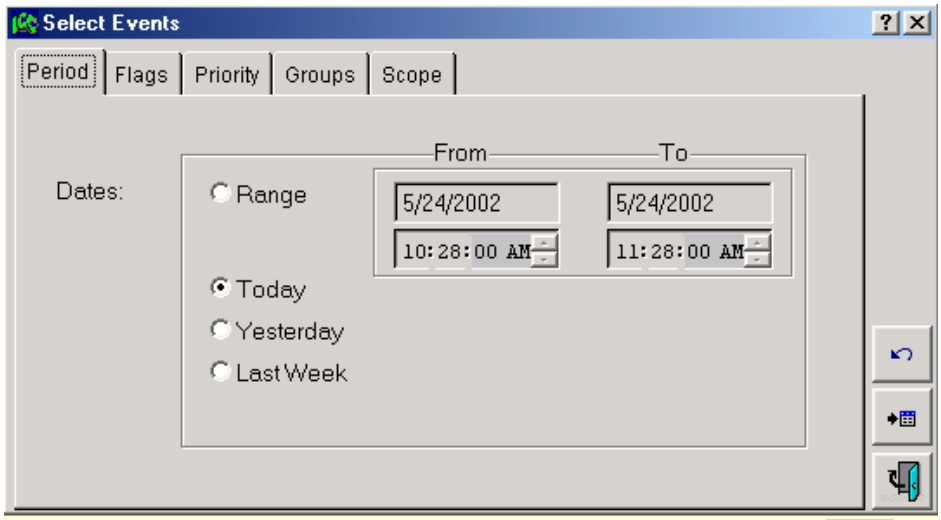
Once finished with this task click "Save". Notice you are not able to add a Fail Priority to an event, since the operator does not have the capability of attaching an event to an actual part of the program.

Event Reports:

From the menu bar choose "Events" and click on the "Report"



By simply checking the flags for "Today, Yesterday, or Last Week" the operator

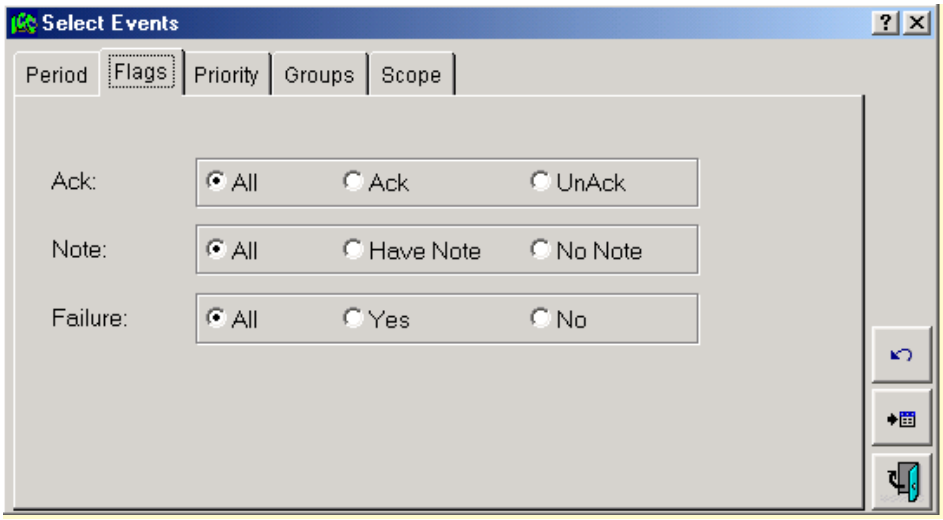


may choose to print either event. To view simply click on the and the new window will display your selection.

Range: to choose a custom range of dates for viewing events check the flag for "Range"

Type in the dates you desire to view.

Flags Tab:

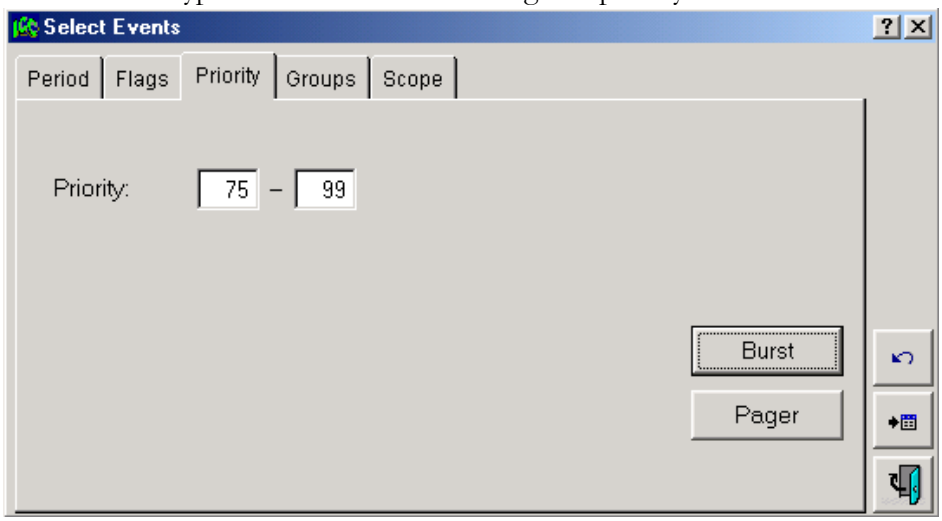


In this window you may choose to print specific set of events based on their status. For example you may choose to pint only events that have been acknowledged by checkering the flag "Ack"

Priority Tab:

Using this tab you may choose to print list o f events based on their priority,

Either type in the lowest or the highest priority or click on the two existing

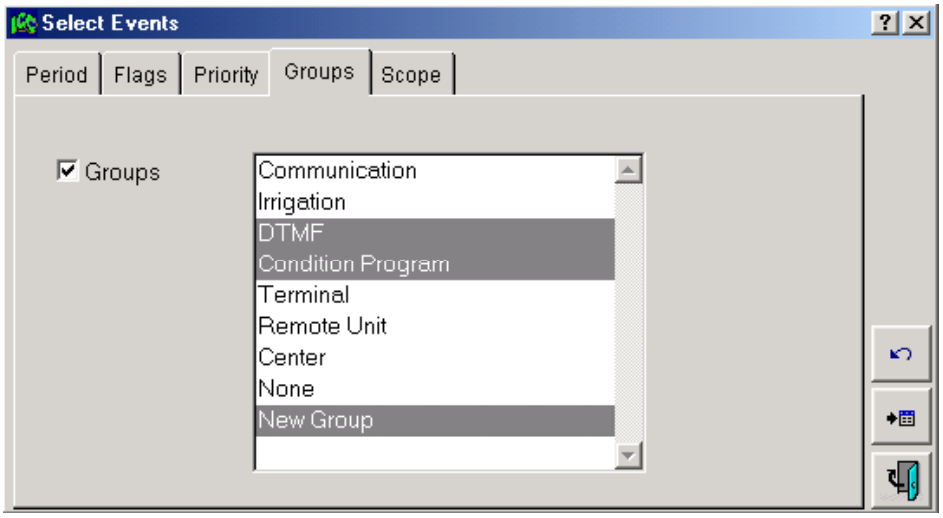


options to fill in the blanks.

By clicking on "Burst" the Priority option will fill in with priorities already set in the "Event Types" window. The same will happen if you click on the "pager" button.

Group Tab:

To print events based on the groups they belong to, click on this tab.

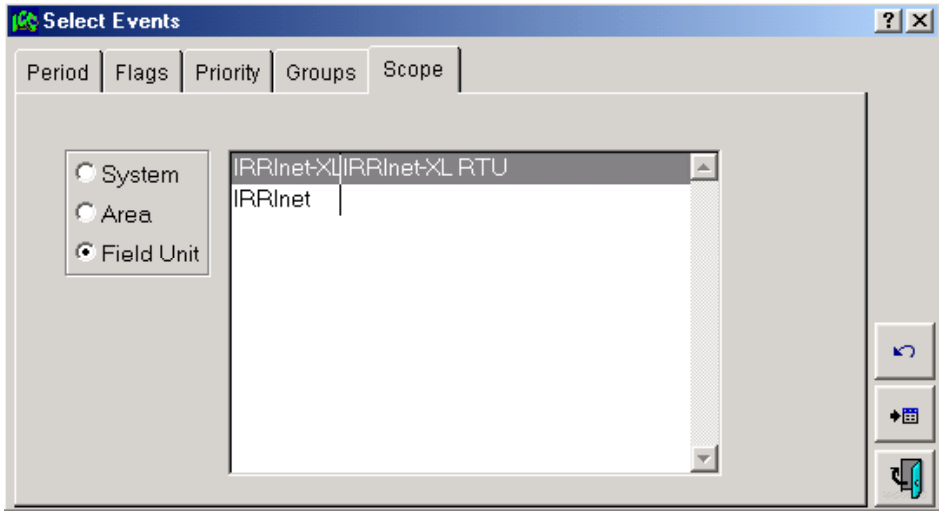


Check the flag for "Groups" and choose the Groups you would like to print.

To choose multiple Groups hold down the "Ctrl" button on your keyboard and click on multiple Groups.

Scope Tab:

Finally you may choose to print events based on System Wide, Area, or specific field unit.



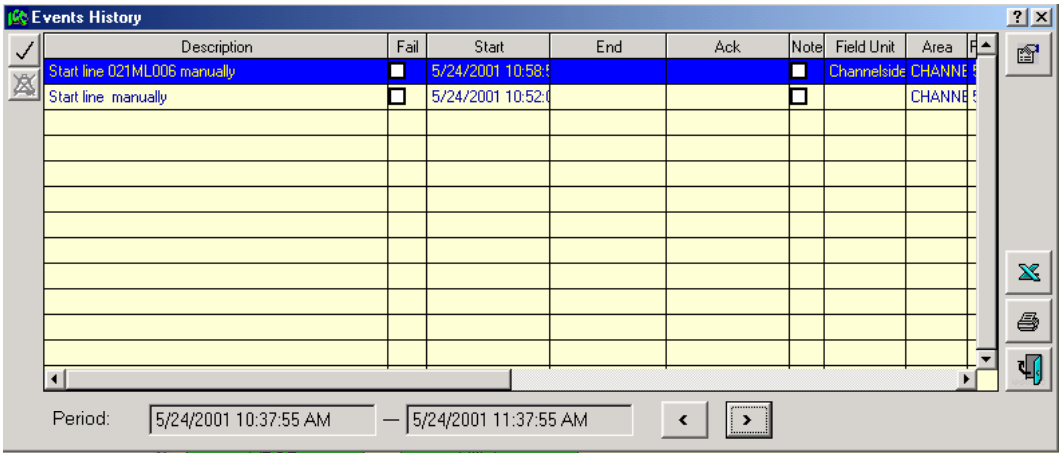
Check the flag for the required option and click on the choice, which meets your need.

Here we chose to print events from a Field unit and then highlighted that field unit by clicking the let mouse button.

After executing "get events" , the following screen will popup. You may re-sort the display by double clicking on any column heading. Further, an operator may attach a note an event by clicking on the report button.

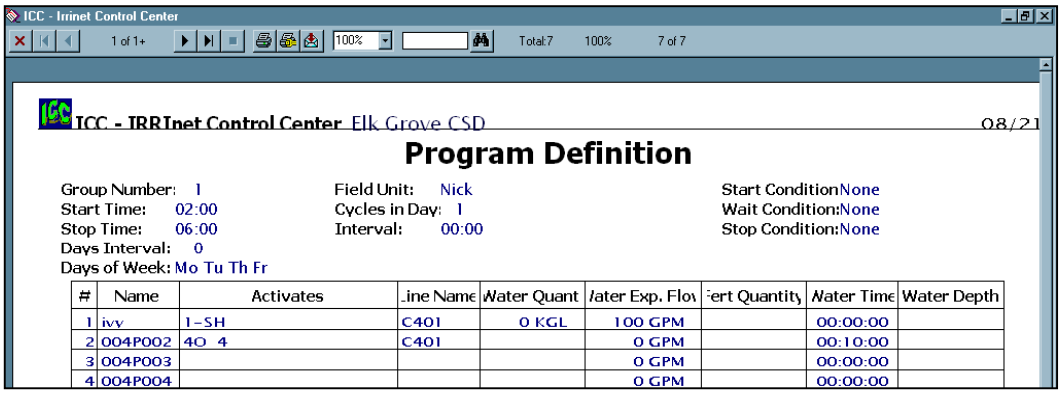
The period originally requested for this report may be moved, chronologically, forward or backward in equal increments to the report time span using the icons with the less than (<) or greater than (>) algebraic symbols.

. .



This report may either be exported (Excel icon) or printed (printer icon).

Reports (Printing Reports and Importing into Excel):


ICC - Irrinet Control Center
1 of 1+
100%
Total:7
100%
7 of 7
ICC - IRRInet Control Center Elk Grove CSD
08/21
Program Definition
Group Number: 1
Start Time: 02:00
Stop Time: 06:00
Days Interval: 0
Days of Week: Mo Tu Th Fr
Field Unit: Nick
Cycles in Day: 1
Interval: 00:00
Start Condition:None
Wait Condition:None
Stop Condition:None
Name Activates Line Name Water Quant Water Exp. Flow Cert Quantity Water Time Water Depth
1 ivy 1-SH C401 0 KGL 100 GPM 00:00:00
2 004P002 4O 4 C401 0 GPM 00:10:00
3 004P003 0 GPM 00:00:00
4 004P004 0 GPM 00:00:00

The mechanism used to generate reports in the ICC provides great flexibility in the formatting and file generation of your reports.

The screen capture above shows the top of the page that is generated when you select report/print of a program (in this case, from Offline Catalog). A separate window is opened whenever you request a report/printout from ICC. Control buttons across the top are defined as follows.

Exit the report generator screen

First page / previous page control

Displays page number __ of total number of pages currently being viewed

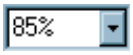
Next page /Last page control

Cancel print job in progress

Print

Adjust printer and page settings

Export this report to a file or other media (Excel, Access)



Zoom control for display of page on screen

Type in a word or number in the window; click on the binocular icon to search report for keyword.

Exporting Reports

Instead of printing reports, you may choose to export report information to a wide variety of formats, including a Word document, and Excel spreadsheet, a comma or character delimited file, an HTML file (automatically creates web pages for you!).

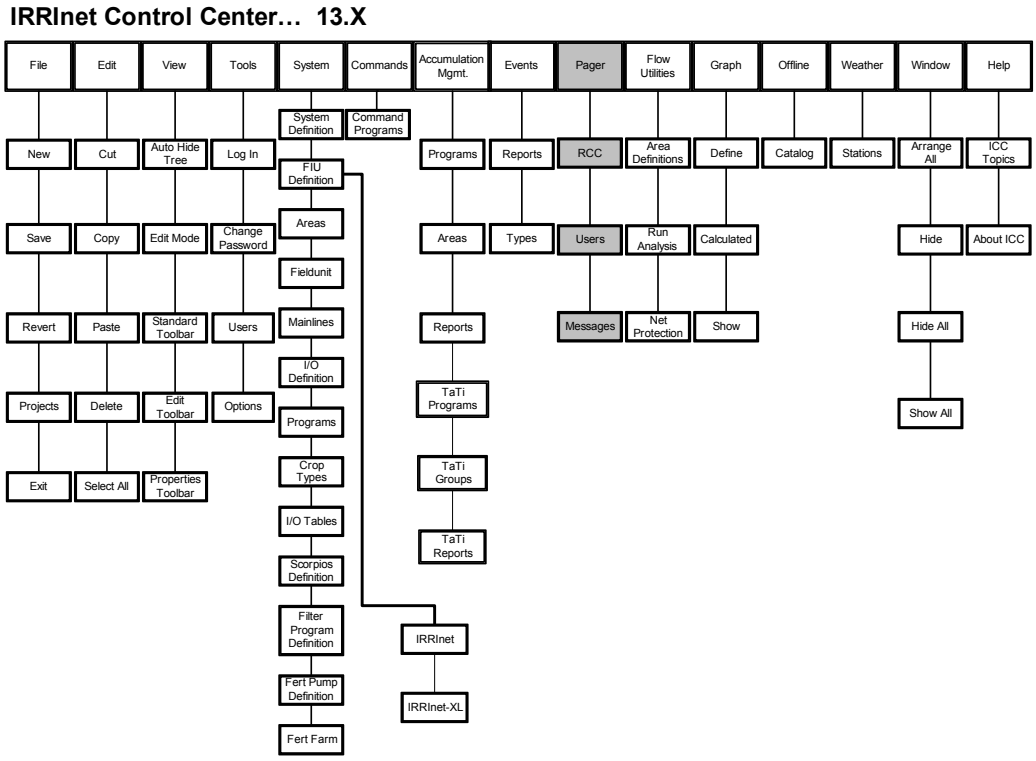
This is a very powerful feature. Using the HTML file option, you can create reports that can then be loaded to a web server for viewing by whomever has access to your web site. The HTML document is universal in nature and can be viewed across a wide variety of platforms, regardless of the operating system and computer type.

Pager:

From the main menu Click on pager.

The use of message pagers (alphanumeric display) is a great way to stay in touch with your system. The ICC software system supports 3 modes of paging: Radio Common Carrier (RCC, using TAP protocol), PeopleFinder paging terminal (direct serial port connection to a paging terminal) and iDEN (Motorola's digital communications service, operated by Nextel in the United States).

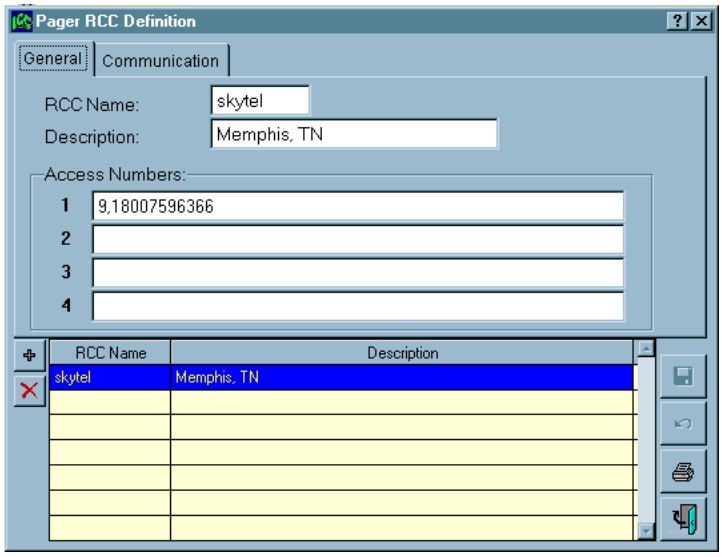
From the main menu, select Pager. Three sub-menu items are available, **RCC**, **Users**, and **Messages**.



RCC:

This is where you set up the access information to the paging service, regardless of RCC, Peoplefinder or iDEN. The communication tab of this popup allows you to enter the specifics about the modem, protocol and password (if required). Click on the Configure button to set the modem properties.

In the General Tab, Choose the name of the service provider and the fill in the description and the Access Numbers. Your service provider provides these



phone numbers.

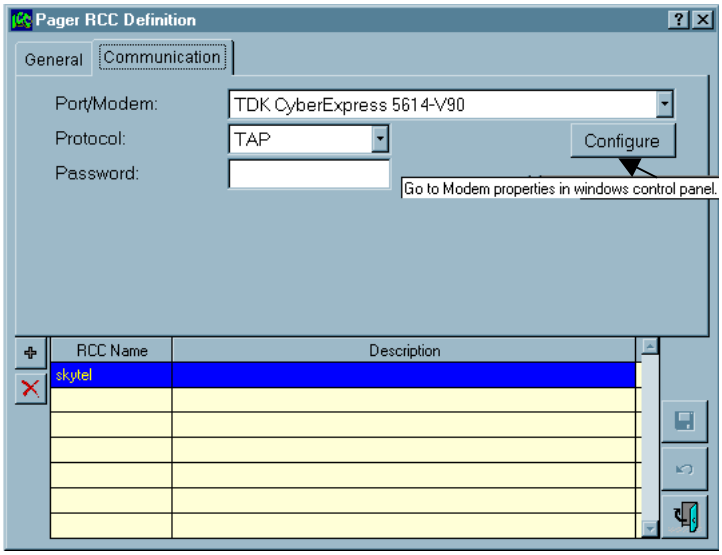
Communication Tab:

In this window you will assign the modem, which is going to be used for paging, and the protocol used.

Port/Modem: From the drop down menu choose the modem allocated for paging.

Protocol: Ask you're paging service provider the type of protocol used for communication.

Password: This password is also provided by your service provider, which will give you permission to enter a session.



Name: Type in the name of the user

Description: Type in the description of this user.

RCC: From the RCC we setup in the last page pick the paging company for this user. You may have more than one paging company serving the users.

User's Pager Number: Type in the pager number for this user.

Pager Language Type: the paging company provides this value.

Send System Name: You may be monitoring more than one ICC system and it may be important to send the name of the system with each event. However if you are the owner of only one system it may be a good idea to uncheck this flag. Some paging companies charge their customer based on number of characters.

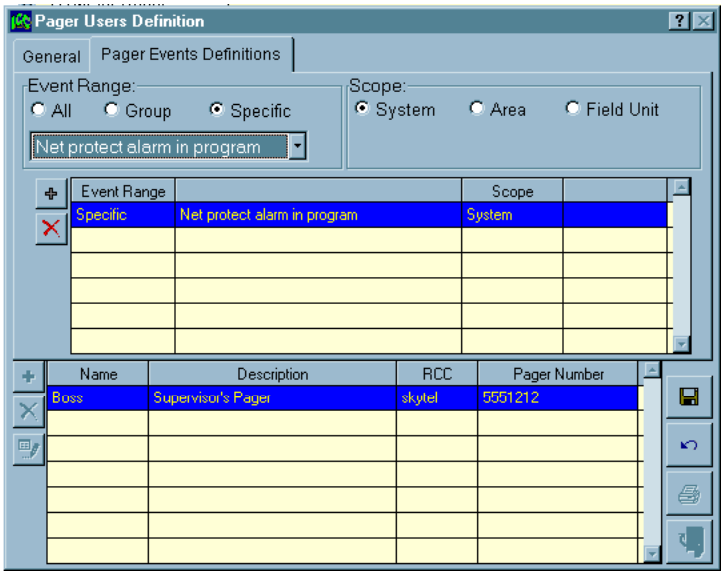
Pager Events Definitions tab:

In this window you will get to choose the type of events you would like to send to each user. Click on the plus sign on the Event Range to create new.

For the Range choose either all, group or Specific. If you choose Specific, a drop down menu appears asking for the Event you like to send.

Scope: Here the operator gets to choose to send this event based on the Scope of the whole system, a cretin area or a filed unit.

If you click on the field unit the list of the field units defined will appear in a drop down list.



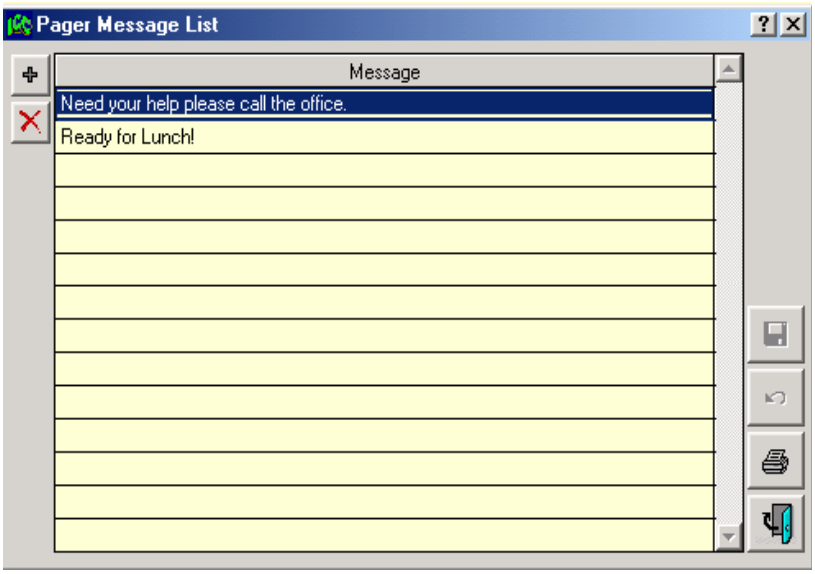
Click save once finished.

In this example, you can see that the "Boss" is setup to receive only messages related to the Network Protection feature of ICC occurring anywhere in the system.

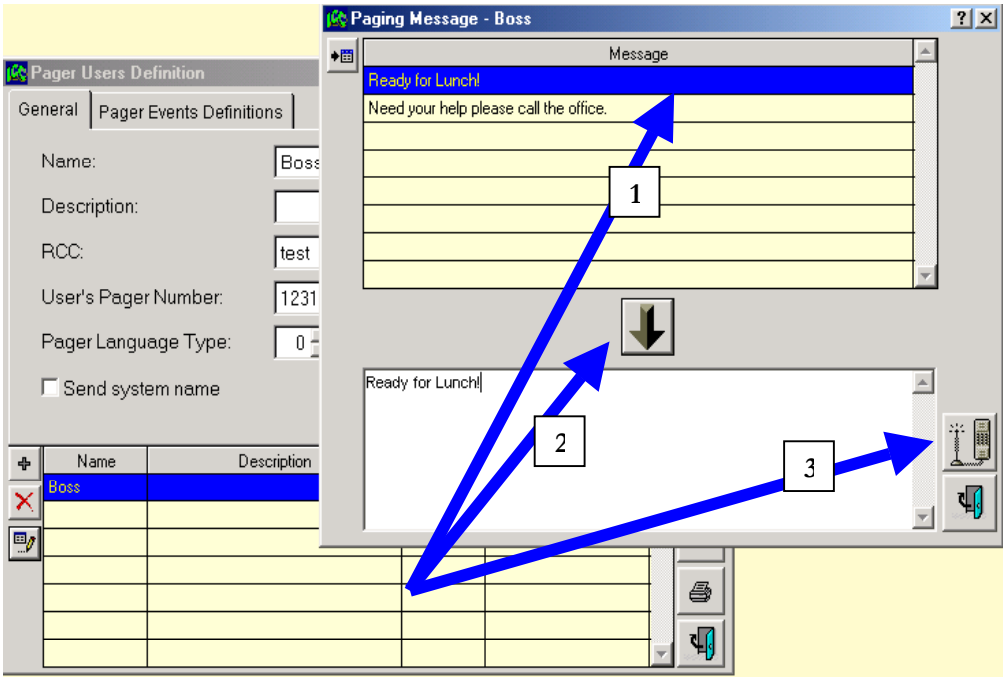
Messages:

From the "Pagers" menu choose "Messages".

To create a new custom message click on the "+" sign and type in your custom message.



Once finished Click on the Save button. Exit this screen and from the pager menu choose "Users. Click on the user you'd like to send a message to and click on the .



In Paging Message window choose the Message you are sending and click on the Once the message appears in the lower box click on the button to send the message.

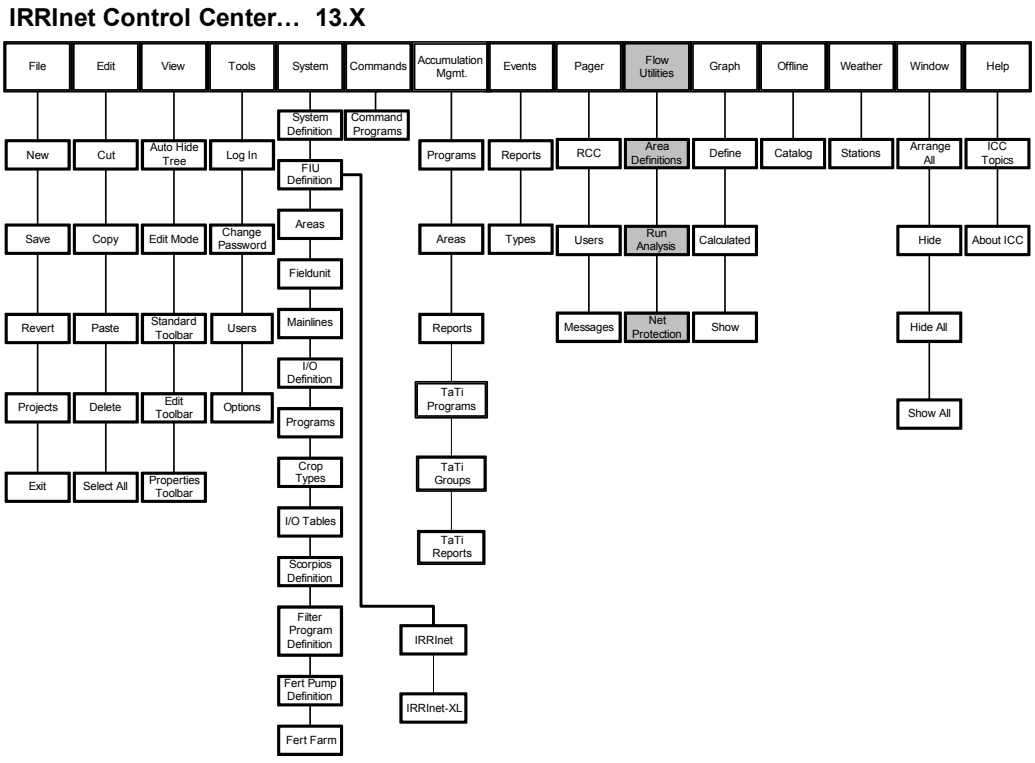
Flow Utilities:

Flow utilities are tools designed for predicting flow in your system. Some county and cities have limit on how much water they can use, or may be interested in predicting how much water they will use in a season. Using these tools will allow you to approximate based on the water you use now, to calculate how much water will you use later.

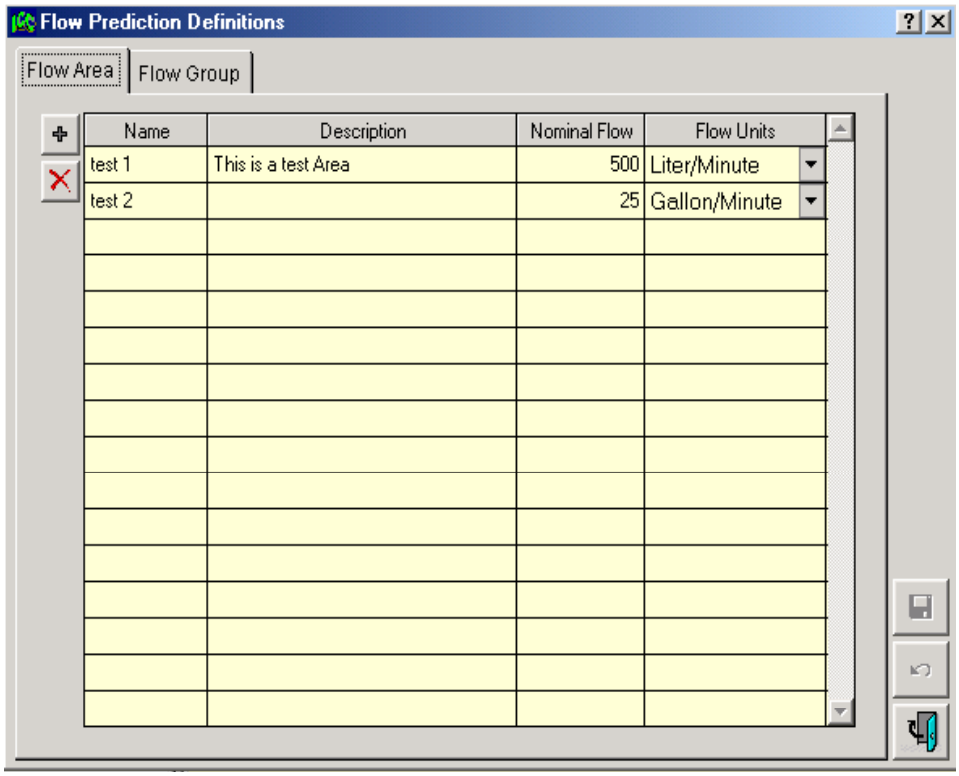
Area Definitions:

We have to first create an area, which we will be using to in our predication of Flow.

From the Flow Utilities choose "Area Definitions"



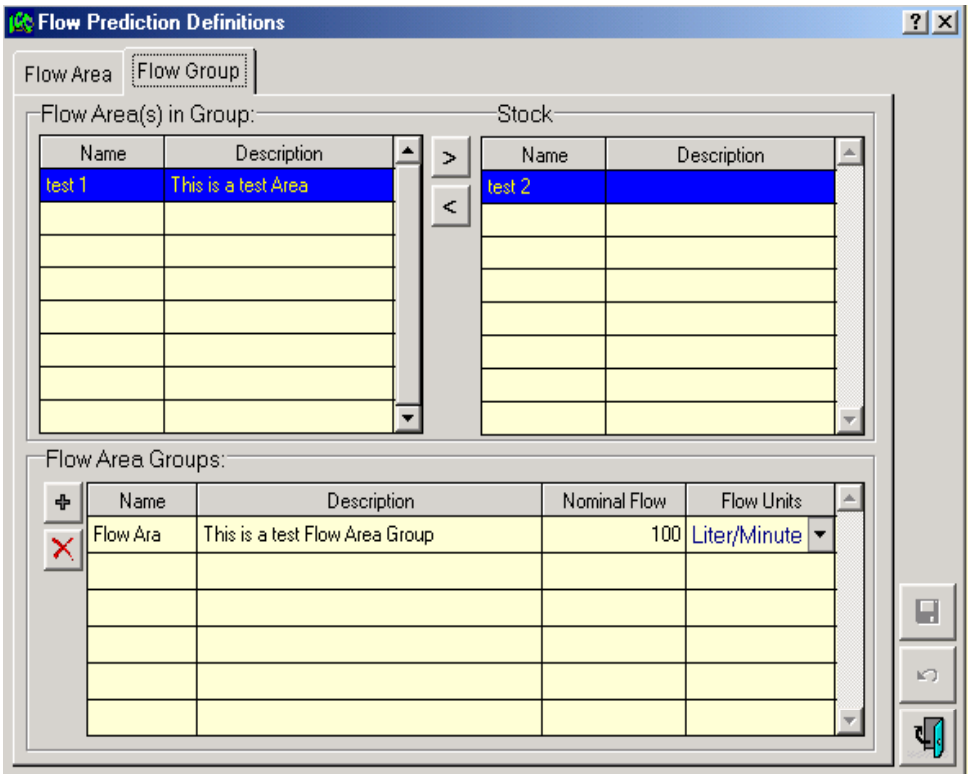
Using the "+" sign create a Flow Area. And type in a description for this area that would make it easier to distinguish it from others in the future. It would be a good idea to also put in a date in the descriptions.



Using the Nominal Flow Column type in the Nominal Flow for this Group, you may define the nominal flow in different flow rates by using the drop down menu in the "Flow Units" column.

Click Save and then click on the Flow Group Tab.

Flow Group Tab:

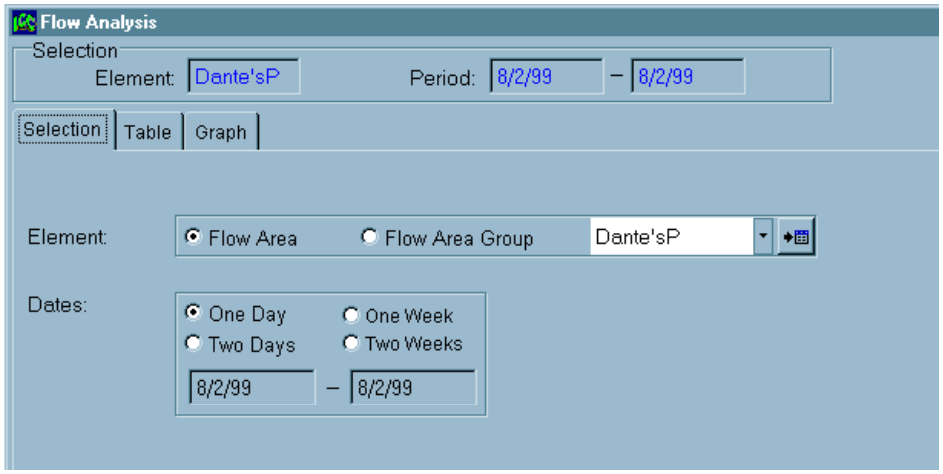


Create a Flow Area Group using the "+" button in this window and using the arrows in the middle of the window move the Flow Area we created before from Stock to "Flow Area (S) in Group.

We have now created an Area and within it we have created a flow Group.

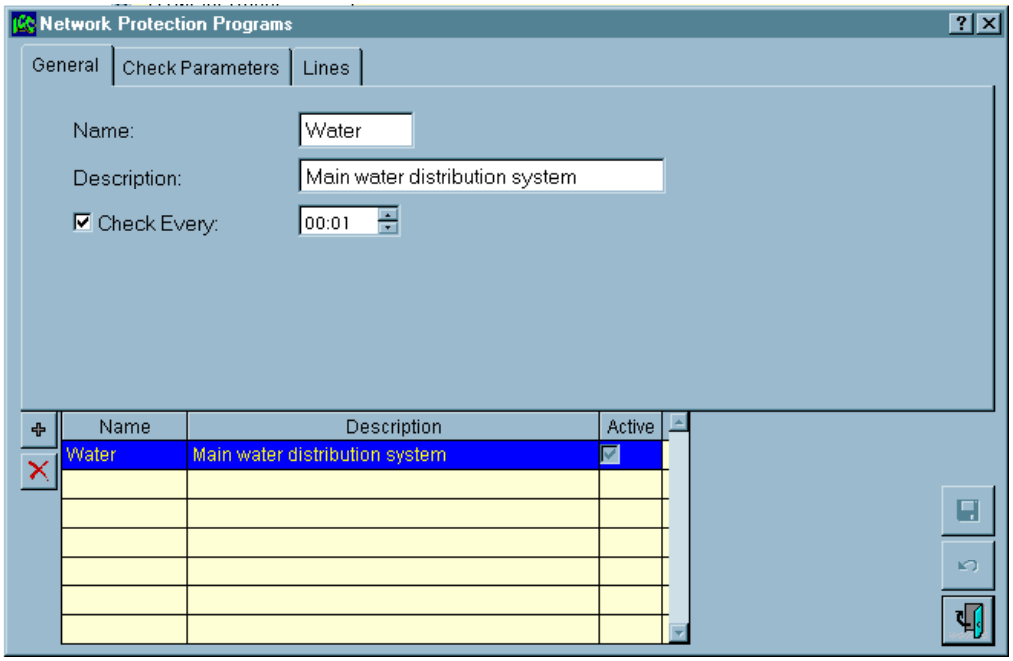
Run Analysis

Select Run Analysis from the Flow Utilities menu. The first tab, Selection, allows you to define the scope of the analysis. The following two tabs present the data first in a table (chronological order of irrigation) and the third tab will display a graph of the predicted flow demand. If no irrigation is scheduled for the span of

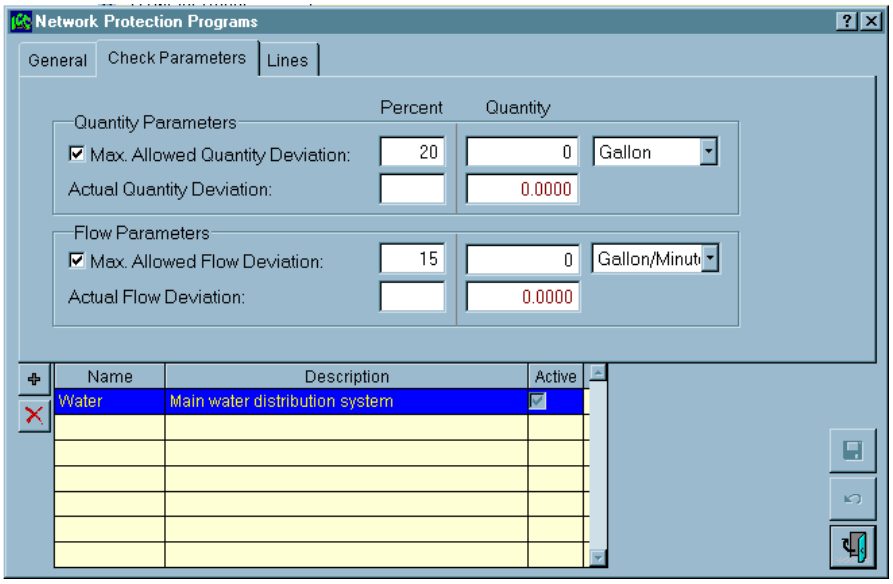


time, a small popup box will appear on the screen advising you of this.

Network Protection

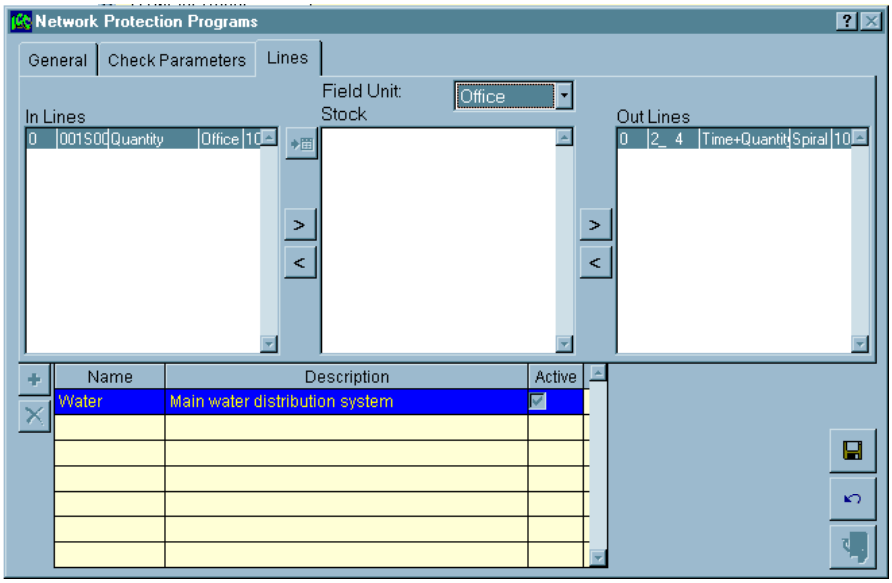


Here you may define a water distribution network. Protection should be provided by water meters measuring water coming into the system (pump stations, reclaimed water sources, etc.) as well as the turnouts or points of



connections where the water is used. Comparing the IN meters to the OUT meters allows detection of a problem, comparing the Totals and/or the Flow Rates as shown below.

Finally connect the various mainlines to provide either IN or OUT meter



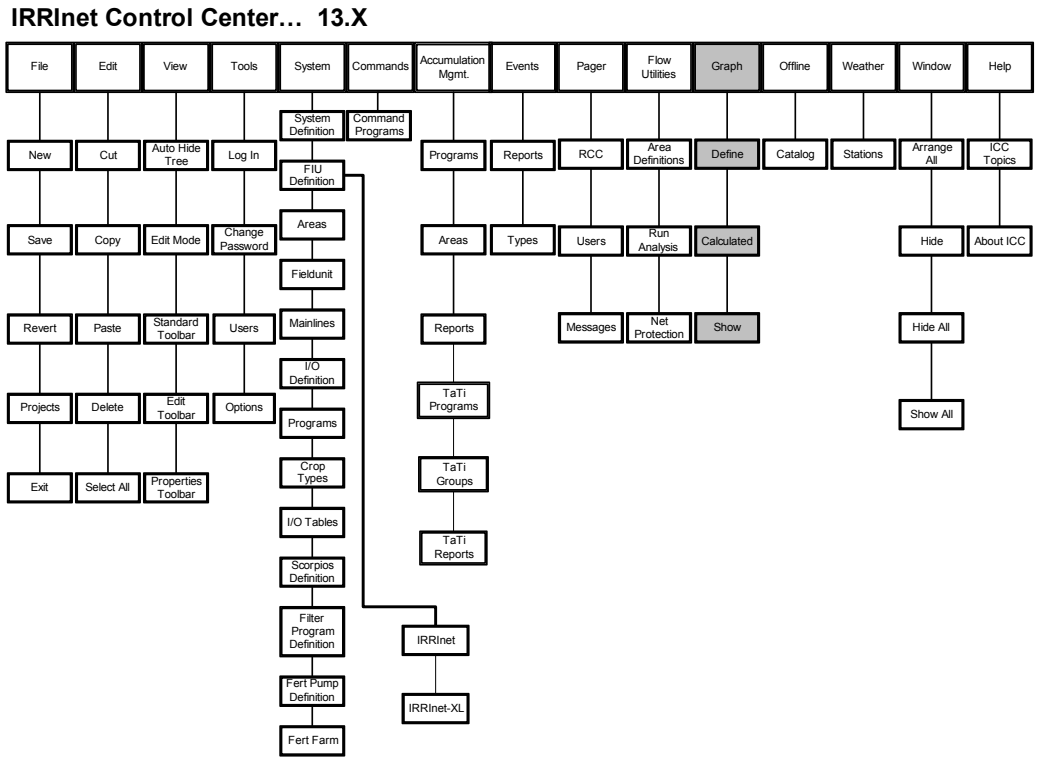
information to the process.

Graphs:

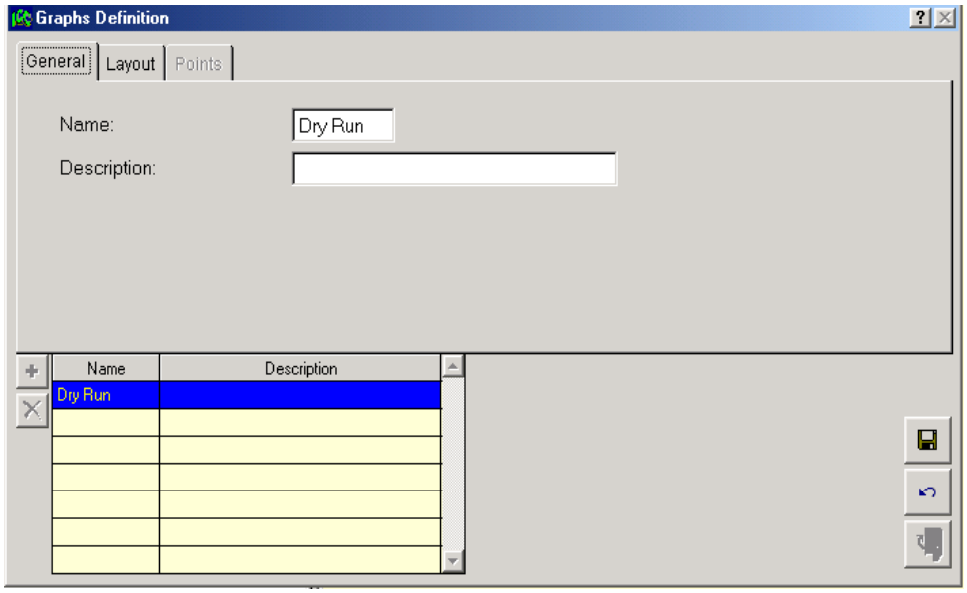
Select Graphs from the main menu. Three options are available, Define, Calculated and Show.

Define:

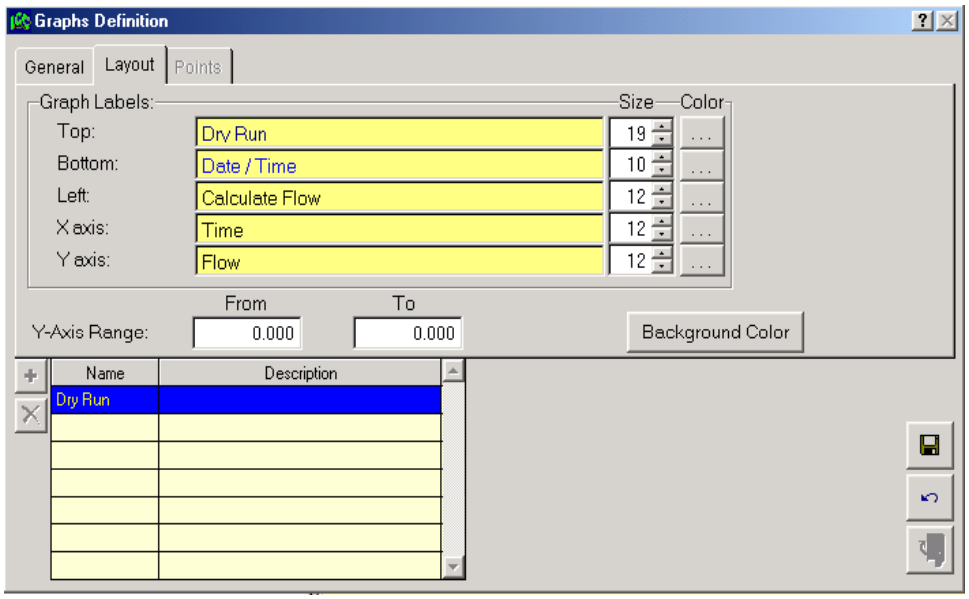
Define the name and a description (optional), and then click on the Layout tab. Here you define the labels and colors, range of values on the X and Y-axis.



General Tab:



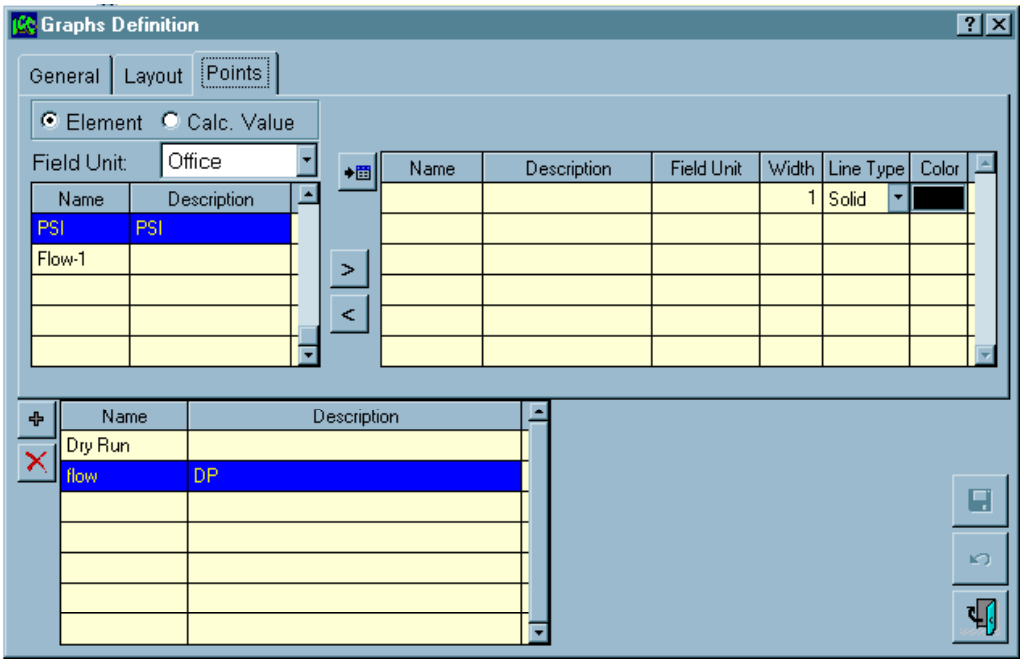
Using the "+" button create a Graph name and type in the description. Click save and then click on the "Layout" tab:



Layout Tab:

Using Fonts and Labels customize your Graph. We have customize this graph to be Time vs. Flow and the Y-Axis range to start from 0, depending on the flow type we will also type in a value for To. Click Save.

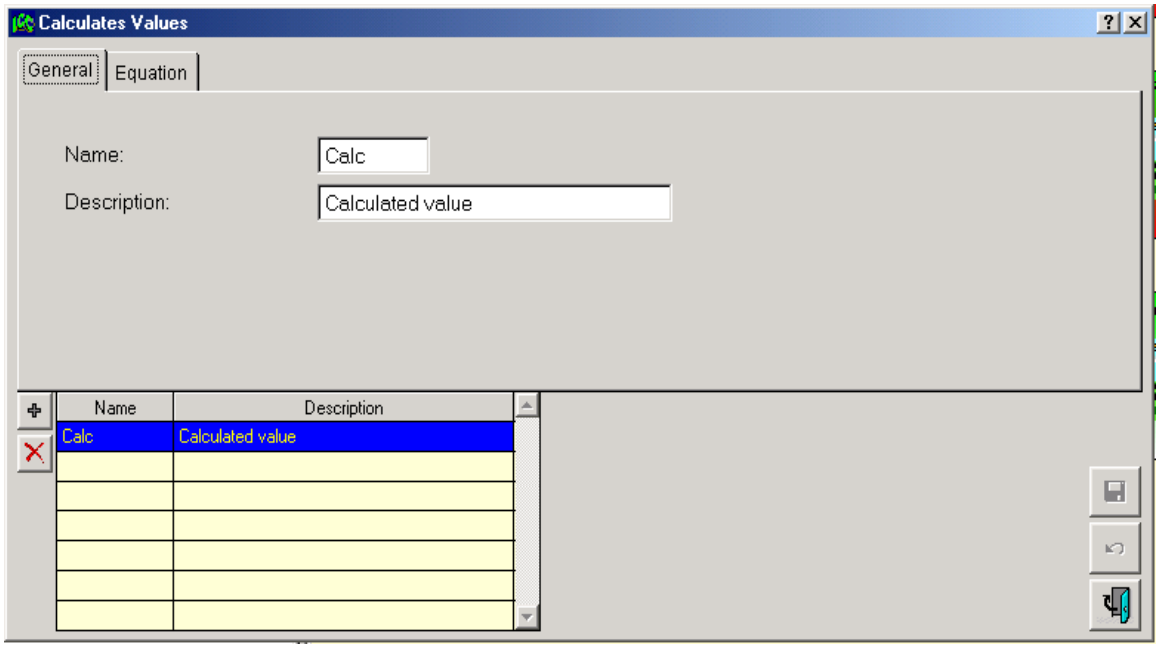
Points Tab:



In the graph named "flow" the following example shows how the tab "Points" is used…to connect data to "pens" -- color of each pen that will trace a plot on the graph is selectable as is the line style (solid, dashed, dotted). You may select an element to graph or a calculated value--for example, this can be a single flow meter (element) or it could be the sum (calculated) of many flow meters.

Calculated

To graph a calculated value use this option. Let us start with creating a



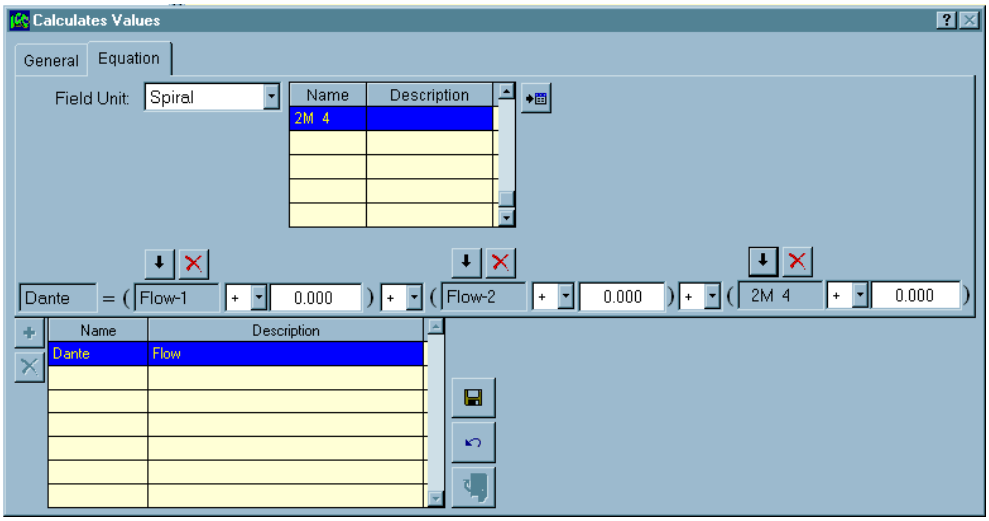
calculation.

From the General tab click on the "+" and type in a Name and Description for this function.

Click on the Equation tab to continue.

Equation Tab:

In this example, three different flow meters are in the equation. From the list at the top of the window, highlight any available meter then click on the downward pointing arrow over the variable field of the equation, in any one of the three positions to insert the element. Note that the operand (algebraic symbol) can be changed to select ADD, SUBTRACT, MULTIPLY or DIVIDE.

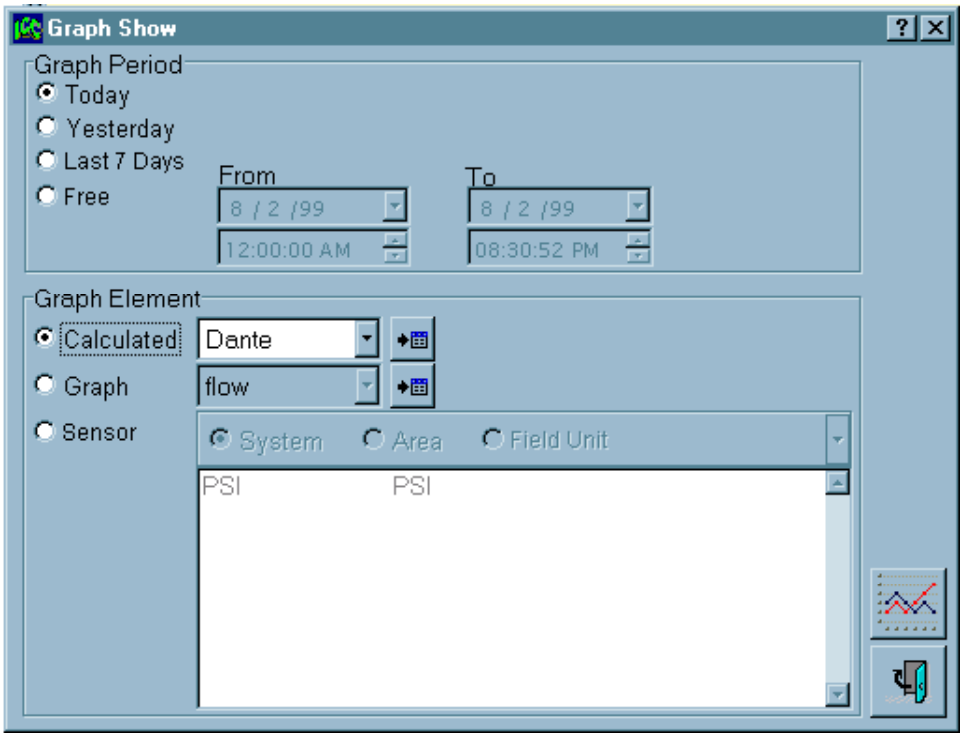


Graph Show:

Select the time period and the type of graph to be drawn (calculated, element graph, or sensor graph).

Click on the icon that looks like a small graph to display.

You can print graphs, as well as zoom in on data points by click and dragging a rectangular target, then letting go of the mouse.

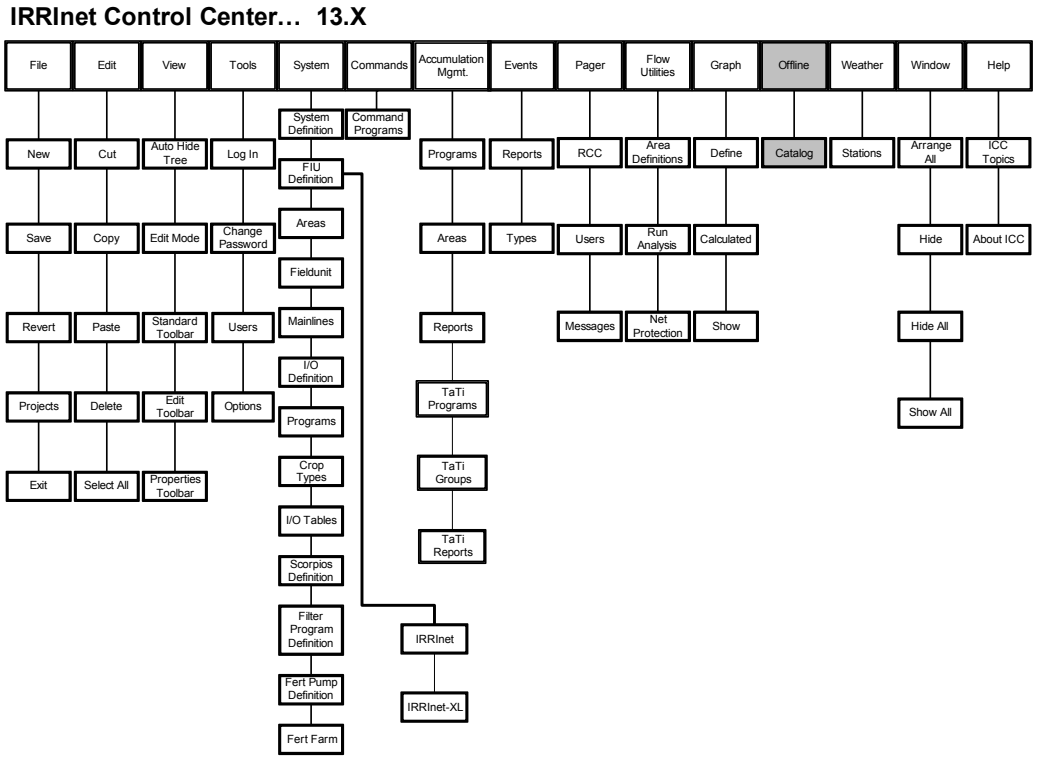


Off line Programming:

Offline programs are designed to create more than one set of programs for a field unit. The field unit itself can hold only one set of programs at all time, but using the power of the computer you can store different set of programs, such that could be dependent on season and any other reason which would require a whole new set of program to be used for an RTU.

You may even automate the switching of the programs by creating a Command that is based on time or a certain condition. For example if May 21st arrives then change to summer programs.

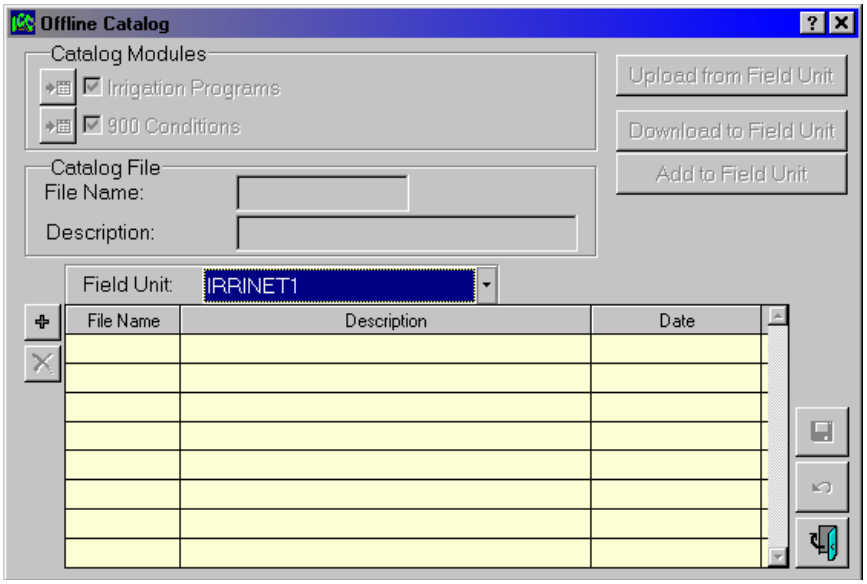
Let us now create an offline program.

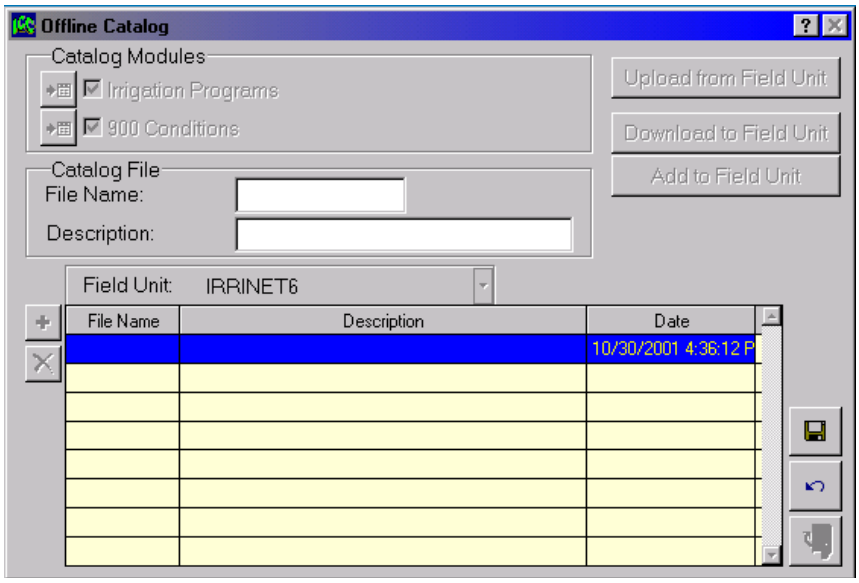


Click on Offline and then click Catalog.

The following window will appear,

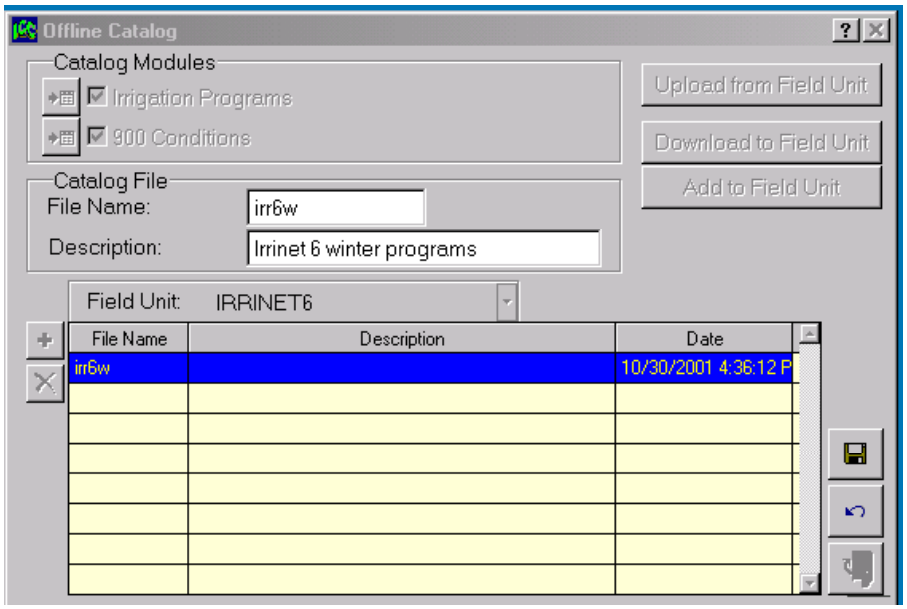
From the Field Unit choose the RTU that we are creating this offline program for.



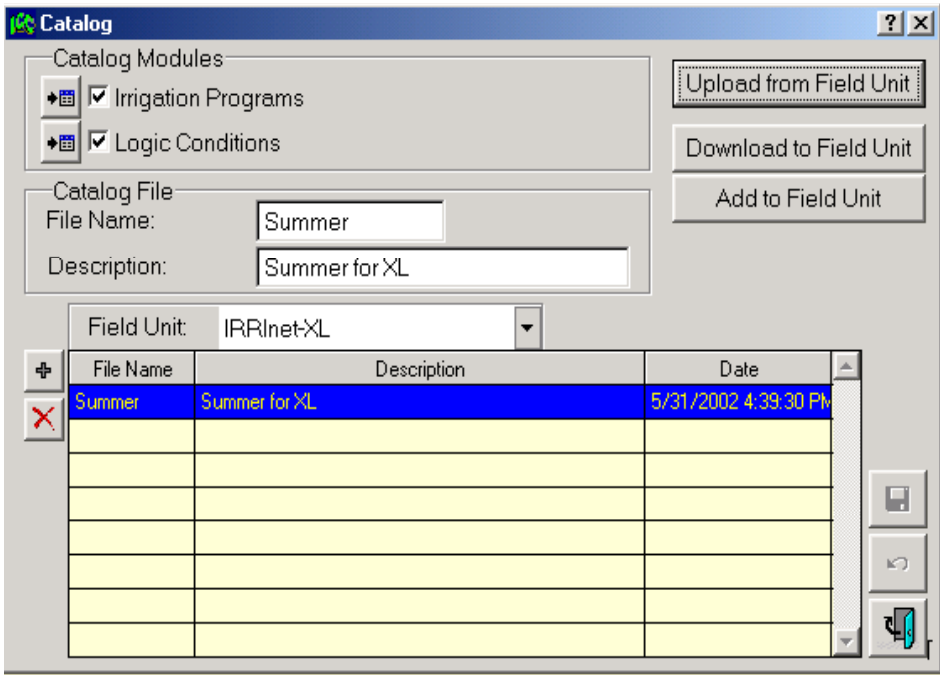


Click on the "+" sign to add a new offline catalog.

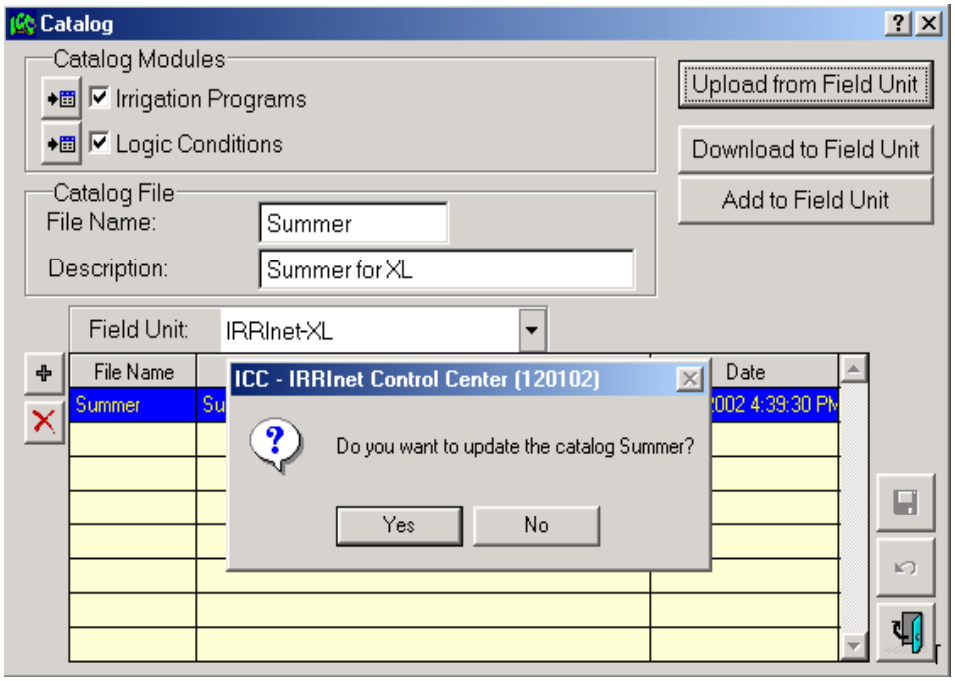
In the fields provided type in the name and Description of this set of offline programs.


Offline Catalog
Catalog Modules
Irrigation Programs
900 Conditions
Upload from Field Unit
Download to Field Unit
Add to Field Unit
Catalog File
File Name:
irr6w
Description:
Irrinet 6 winter programs
Field Unit:
IRRINET6
File Name
Description
Date
irr6w
10/30/2001 4:36:12 P

Click Save.


Catalog
Catalog Modules
Irrigation Programs
Logic Conditions
Upload from Field Unit
Download to Field Unit
Add to Field Unit
Catalog File
File Name:
Summer
Description:
Summer for XL
Field Unit:
IRRInet-XL
File Name
Description
Date
Summer
Summer for XL
5/31/2002 4:39:30 PM

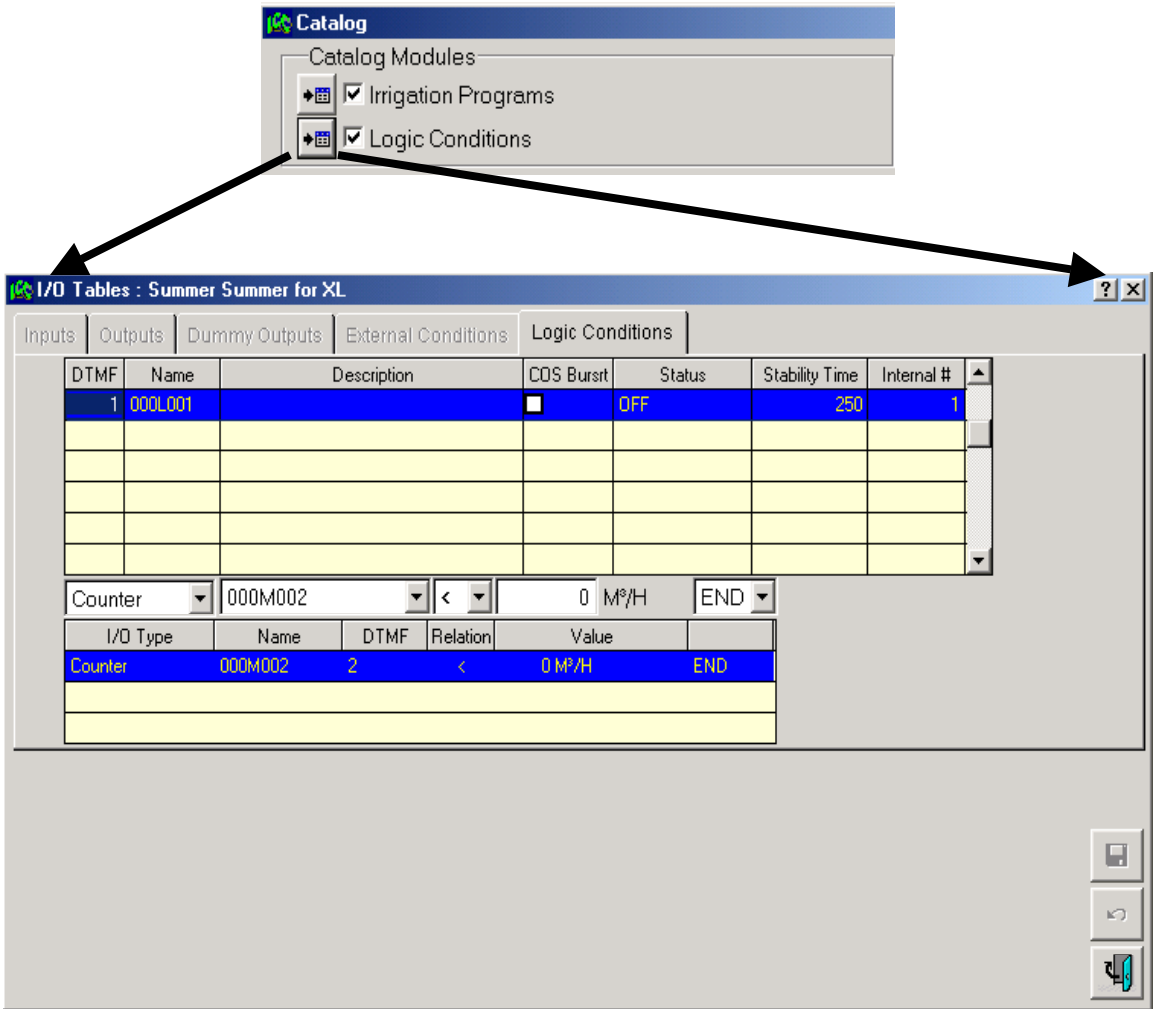
It is Crucial to pay attention here, your offline programs are currently empty, and you may upload from the field units by clicking on "Upload from field unit.



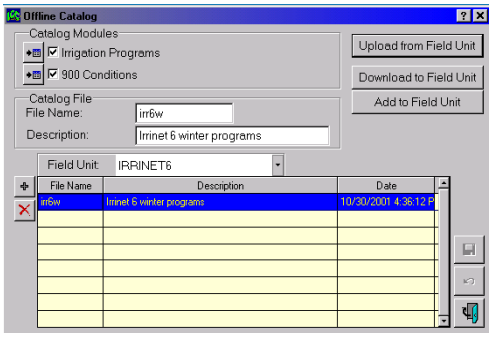
Click "yes" to confirm your action.

As soon as you click yes the upload is done. The upload is not actually done from the field units but it's from the saved programs in your project locally on your computer that is exactly the same as the programs in the field.

You may choose to edit the Logic Condition conditions of this offline programs that was uploaded by clicking the table icon to left of Logic Condition conditions.

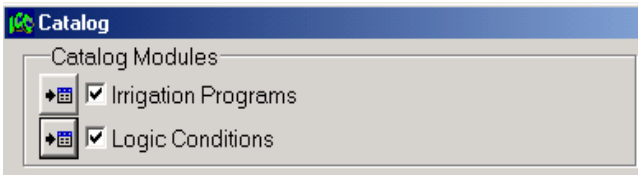


After editing the uploaded Logic Condition conditions (Above) click on save and

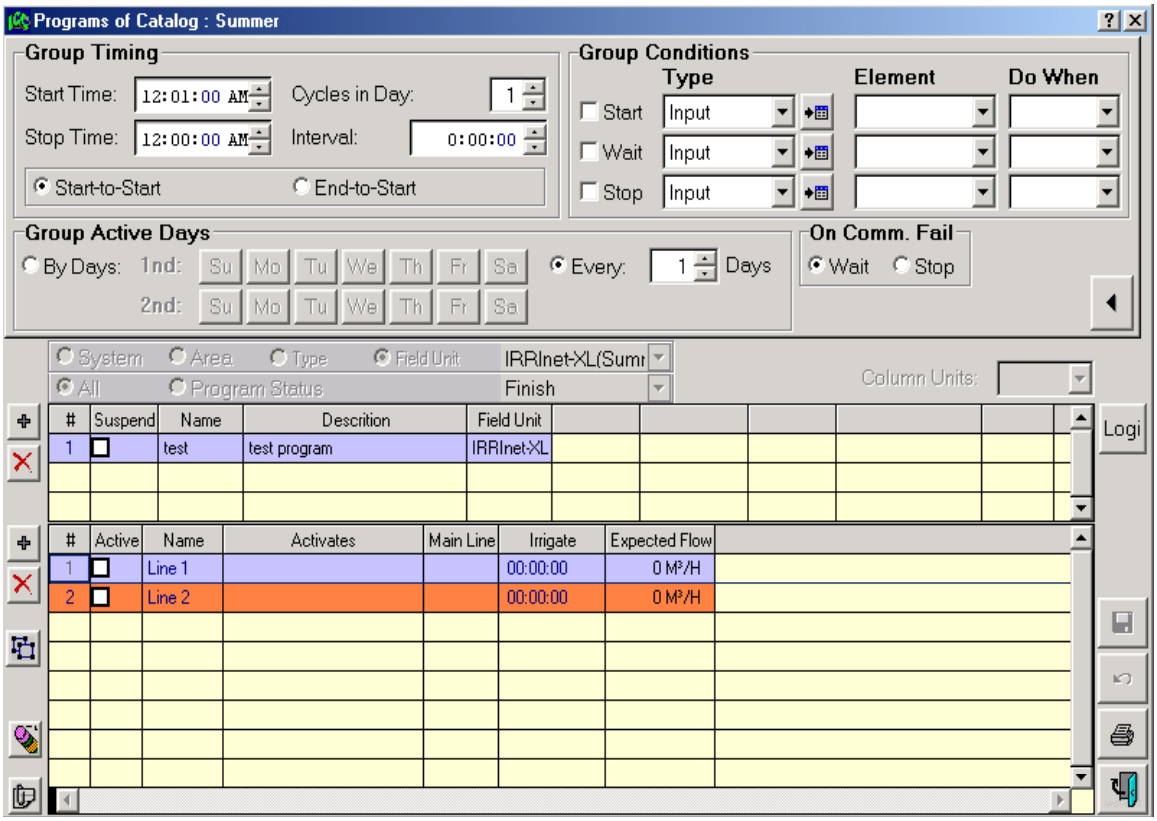


go back to the offline Catalog window.

Click on the Irrigation Programs table to edit the uploaded programs.

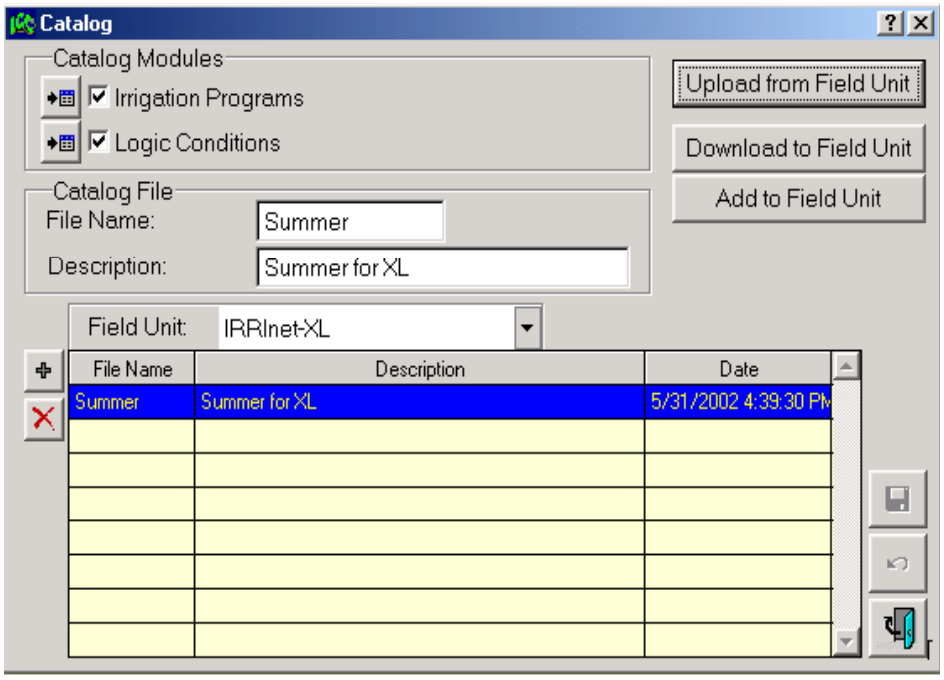


You may now modify the offline programs. For example if these set of programs are for rainy season, you may choose to change the amount of water you choose to use.



Click Save when you have finished making the modifications to this offline programs.

When the time comes to download your offline program, choose the correct Field unit and click on "Download to Field Unit"

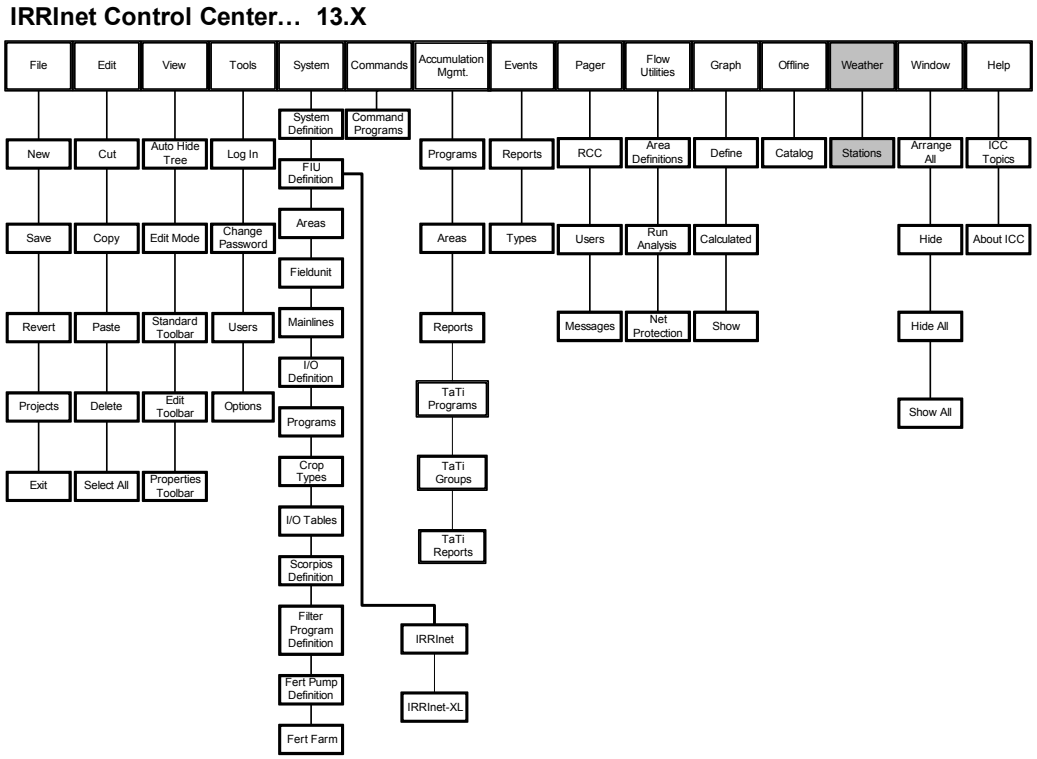


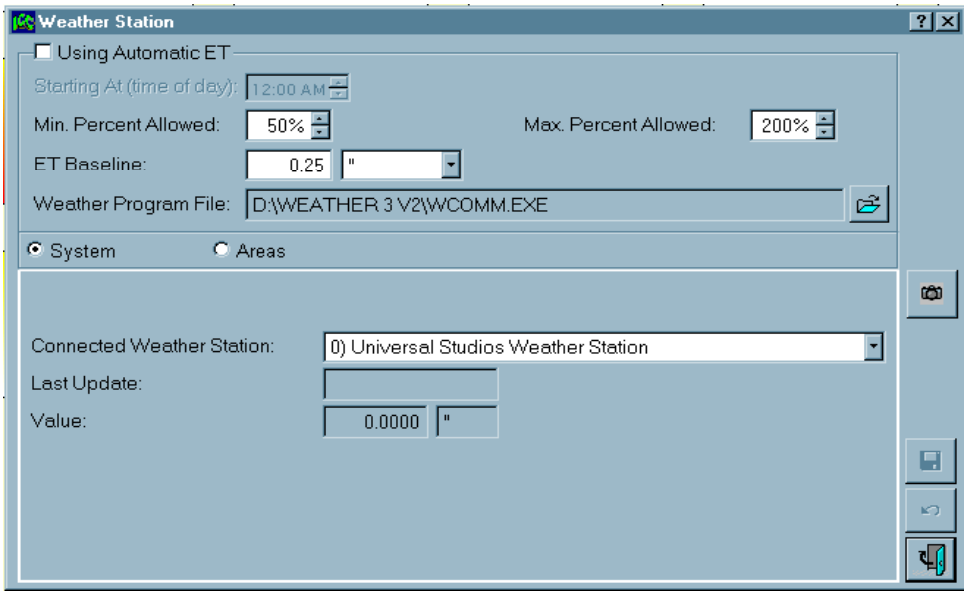
If you choose to just download the changes you may click on "Add to Field Unit", and you will only download the change you have made to the offline programs and Logic Condition conditions to the field unit.

Weather Station

ICC currently supports concurrent operation with a third party Weather Station software, Weather-3, by Aqua Engineering (Fort Collins, CO, telephone 970-229-9668).

To access Weather Station support, click on the menu item "Weather" then click on the drop-down "Stations".





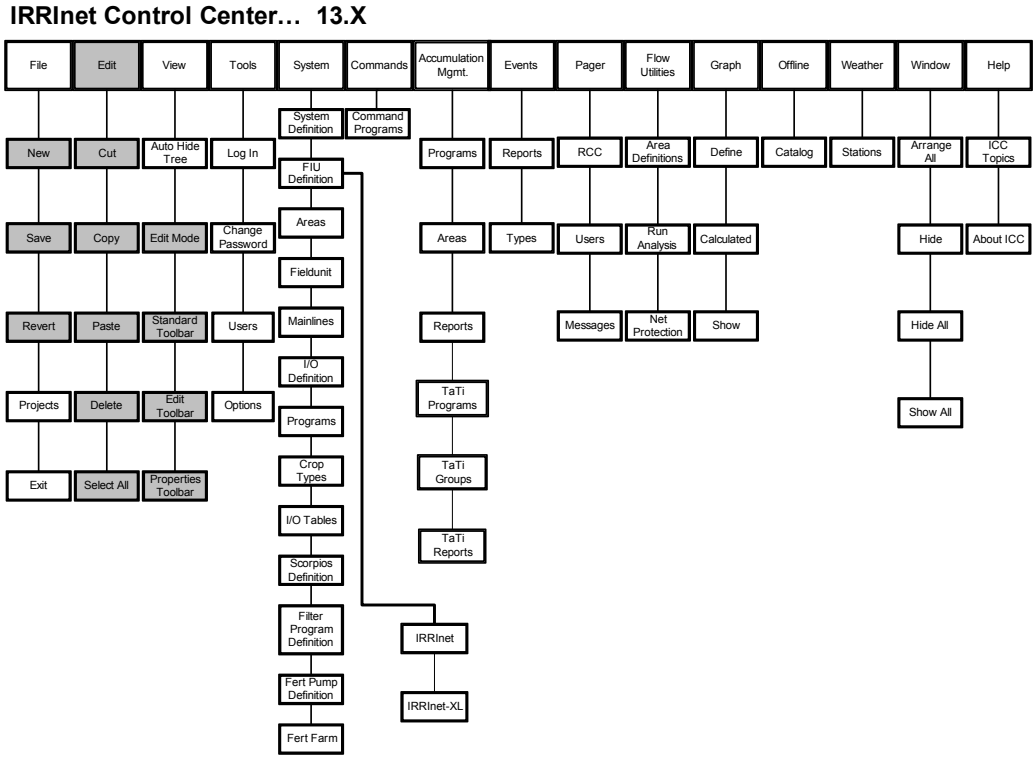
The screen below will pop up. A weather station is assigned to either the entire system or to one or more areas. If you select to use Automatic ET, the system will launch Weather-3 at the assigned time and will result in a water factor adjustment (within the min./max. limits you set). ET Baseline is used as the divisor (denominator) in the equation that generates the water factor. Daily ET is divided by the baseline and converted to a percentage adjustment factor.

You will need to "point" the ICC software to the location containing the Weather 3 executable (WCOMM.EXE) as shown in the example. Click on the folder icon and browse your hard drive to find the correct folder location.

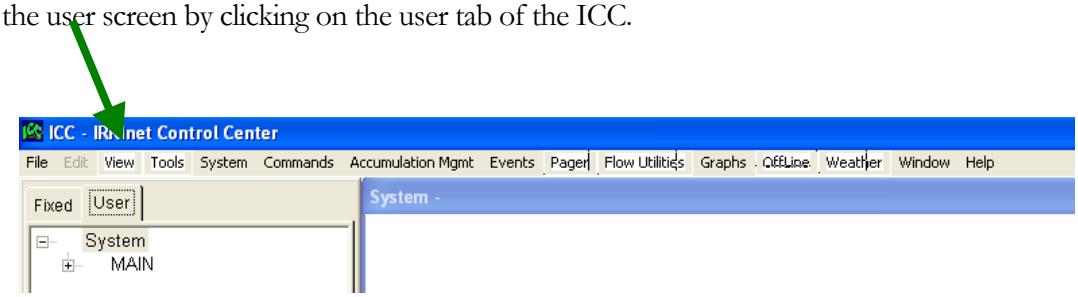
The "camera" button, right margin of the popup, allows you to initiate an update of the ET data now and will result in an adjustment to the water factor if values have changed.

ICC-Graphics Guide (User screen):

You have the option of using the "User" tab of the ICC software to display your system using custom-created maps/diagrams/pictures. Switch to this mode by clicking on the "User" tab of the screen. The basic concept behind the "user" graphics is that you can create a screen, apply a "base" image on top of which you import and place other "objects".



Go to the user screen by clicking on the user tab of the ICC.

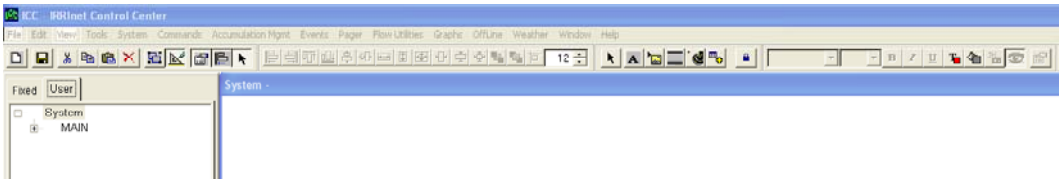

ICC - IRRInet Control Center
File Edit View Tools System Commands Accumulation Mgmt Events Pager Flow Utilities Graphs OffLine Weather Window Help
Fixed User
System
MAIN
System -

The User screen has two modes, (1) display and (2) edit.

Once in the User section you may start editing this screen.

To start the edit mode, from the view menu choose "Edit Mode" or click on CTRL + E

This will cause the tool bar to change and a new set of options appear.



Let us break down these icons and review them one by one.

Toolbars

The first portion of the tool bar is the standard windows buttons.

Define new screen. You create screens that are either at the same branching level or as a new subordinate branch.

Save changes.

Cut image (to clipboard).

Paste image from clipboard.

Delete image.

This button is used to group or ungroup icons from their description

Leave or enter edit mode. When this icon appears depressed, it indicates you are in the edit mode. To leave the mode, you can click this icon or use the hot keystroke [Ctrl+E].

When this button is pressed it enables the toolbar for text editing.

The text editing tool bar allows you to change the text of an icons description.

When this button is pressed it enables the Alignment toolbar.

The Alignment toolbar allows the designer to align pictures, bring pictures and icons to the top or hide an image behind another image. By floating the mouse arrow on the icons a description appears to help locate the correct button.

Design Strategy

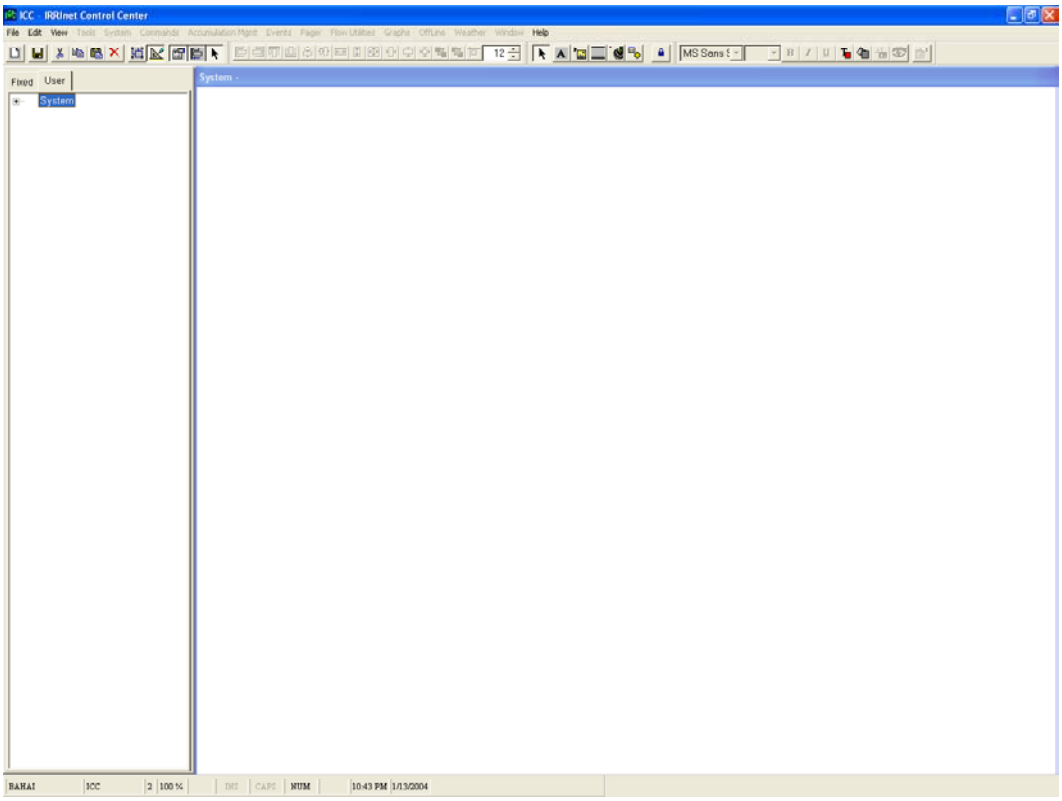
Think of the "user" screens as progressive "zoom" views of your system, starting with an overall view of a map the system ending with a final zoom that displays the detail view of the valves located on a drawing or map of the site.

Resolution Issues

If you are running your video display with the XGA (1024 x 768 pixels) setting (recommended), the default space for the user-created graphics is 754 x 490. Any image you create (map, scanned image, etc.) that will form the "base" of a screen can either be limited to this size, or if it exceeds it you will get horizontal and vertical scroll bars when you insert the image.

Note that you also may change the screen windows by dragging the borders of the events and the "tree" to increase or decrease their respective area.

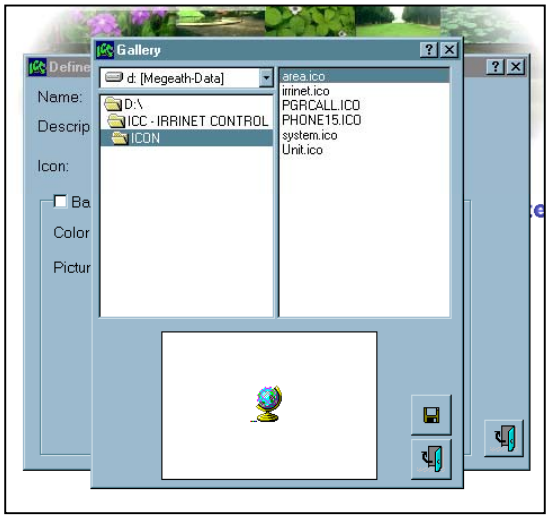
Organize and Outline



You will want to create enough zoom-in steps so that system operators can easily select the final view. You are not limited to System-Area-Field Unit steps as in the "fixed" display mode of ICC; in fact you can create as many steps as needed. Each step will be a new screen, which should have a unique name. Organizing your design in an outline form to display the parent-child screen relationships will speed the process.

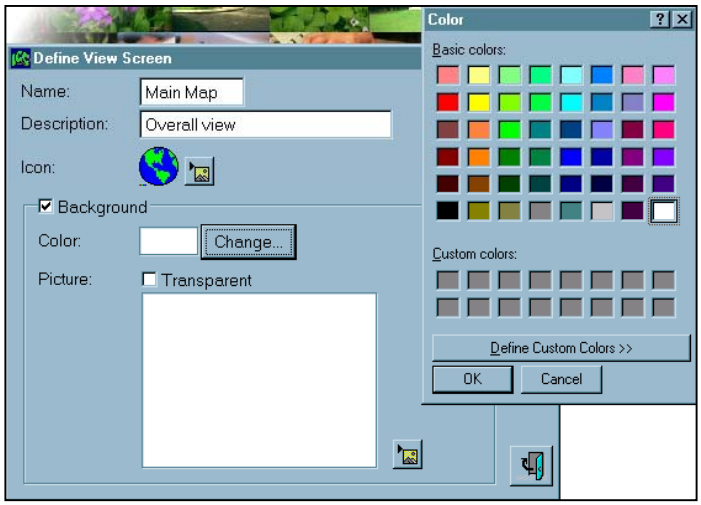
Create the outline first, and then start adding screens in the "tree" side of the "user" graphics display. Right-click on the "System" in the tree window, and then select Add Next Level.

A pop-up appears "Define New Screen". With your outline of the screens, enter the name of the first screen that will form the root level of a branching structure.

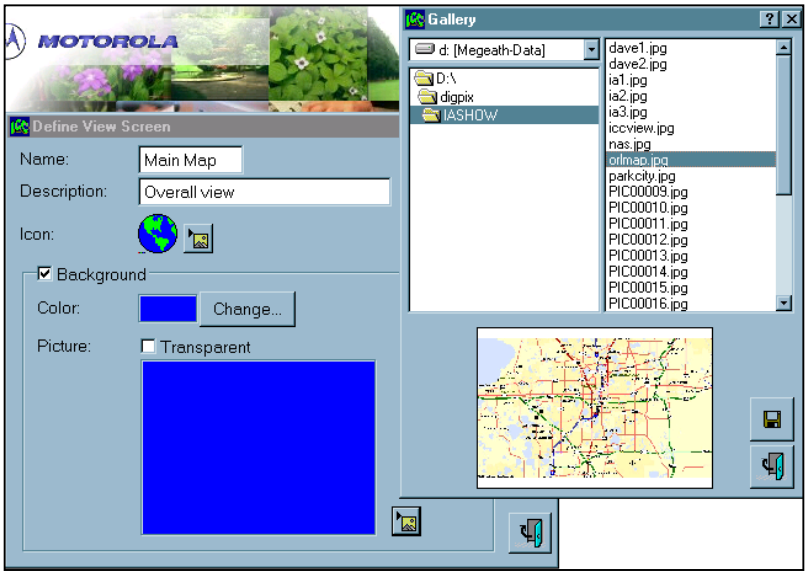


In this same pop-up, you can select an icon (will appear in the tree).

In the Define New Screen popup, you may also set parameters for the background --both the color as well as the "base" image to place in the screen.



First, select the Change button and the color chart will popup, allowing you to change the background color.



Next, you will click on the icon that allows selection of a graphic file to place in the background.

A popup, "Gallery", allows you to browse the various folders on your computer and then select a specific file. Double-click on any folder to move up or down the hierarchy of folders; use the drop down selection to change logical drives.

Your choice of graphic files is fairly open, use most any common format. JPEG files are recommended for efficient file size and storage. Bitmaps, GIF files, etc may also be imported. Preparing your graphic images ahead of time and placing them in one folder on your computer will simplify the process.

Prepare each page in this manner. The next steps involve placing the labels, buttons and icons on these screens.

Create the screens in branching according to your outline and their respective parent-child relationships. In this example, the result of right clicking on the "New" branch shows a popup menu where you can either add another screen at the same branching level or add next level down.

Branches may be "cut" and "pasted" to different locations. Right click on any branch to cut then right click on the branch to which you want to move and select paste.

Draw Controls Toolbar

This toolbar provides the icons needed to add labels, additional graphic images, navigational buttons, specific inputs/outputs and area/field unit icons on top of the page you create. You may lock or unlock any button. Mouse actions are indicated as either "click" (left mouse button) or "right click" (right mouse button).

Selection tool, when depressed, you can right click on any object placed on the screen to bring up a menu with actions that may be performed. Or click and drag a rectangle to select one or more items placed on the screen.

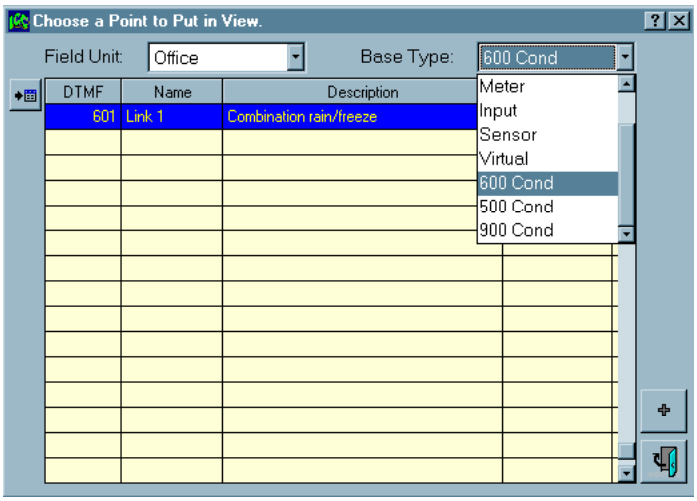
Create a label for the screen. Click on this button and then click inside the new picture to create a placeholder for a label. Use the edit box (Properties Toolbar) to change the text of the label after highlighting the newly created label (click on the label field you just created, it places "handles" around the rectangular label field). Note that when the "handles" are displayed, you can resize the rectangular field for the label by click-drag of any handle.

Add a picture on top of the screen. Additional graphic images may be applied on top of already-existing base image(s).

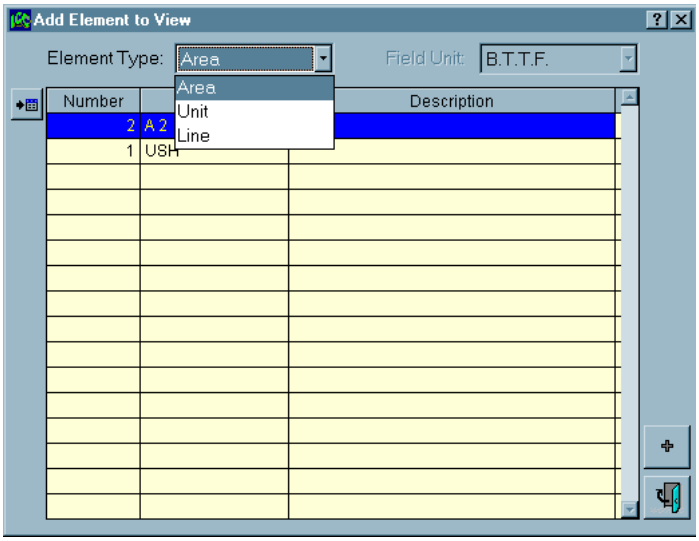
Create a button that will "point" to another screen; think of them as "Go To ___" buttons where you name the screen to display when this button is pushed. (It is recommended that you first create the screens in their final hierarchical (branching) structures first, and then create the buttons for navigating back and forth between screens or jumping up/down levels of the branching structure.

Insert an icon representing input or an output. This allows you to import any icon for water meter,

Fert meter, valve, pump, switch, digital input, etc. These icons are "live" objects that connect to the actual status and command parameters. After placing these icons on the screen and saving your changes, you will be able to right-click on each of them and you will get a popup menu just like in the "Fixed" mode of displaying the system. (See separate section on how to create your own I/O icons.)



Select the icon, click on it, then move into the active window (graphic window, user mode) and click the mouse again, pointing the location where you want the I/O icon to be located. A table pops open, allowing you to select field unit and type of I/O from the list. Select an I/O from the table after base type is selected. Click on the + button to add the element to the drawing page.



Add an "element" (area or field unit icon). You can place an icon representing an area or a field unit on top of the screen. These icons are also "live", and will change color and text displays (e.g., red for alarm, "Stop" if any main line is in stop) as the data changes are reported in from the field. If you want to use the "element" as a " button", you must add a button adjacent to the field unit or area icon. (See separate section on how to create your own area and field unit icons.)

After selecting to add an element, move the mouse into the drawing page and click on the location where you want the element located. A table opens (shown above) that allows you to select Area, Unit, or Line. After selecting the element type, from the table pick the element (click on it once to highlight) then click on the + button to add the element to the drawing page.

Lock button. If you need to place a number of I/O icons on top of the screen, first select the icon, then press the lock button. Now you can click on the picture and each time it will open the I/O table from which you can select the next I/O to place on the picture. The same function works for buttons, add picture or add element icons.

Properties Toolbar

Use this toolbar to change parameters related to label fields. By right-clicking on a text field of an object (could be the label for an area icon, field unit icon or I/O icon) you can change the: font, font size, appearance (bold, italic, underlined) as well as text color.

You can adjust whether the object is transparent (allowing the base image to show through) or place the object on an opaque background.

If you right click on an object, you can change the fill-color.

When you create a label window this "edit box" allows you to change the text in the label.

Font Type

Font Size

Bold; Italic, Underline

Text Color

Separate Text from icon, click on this button and drag the text away from the Icon, this will allow you to have an icon with the text (description) in another location on the screen.

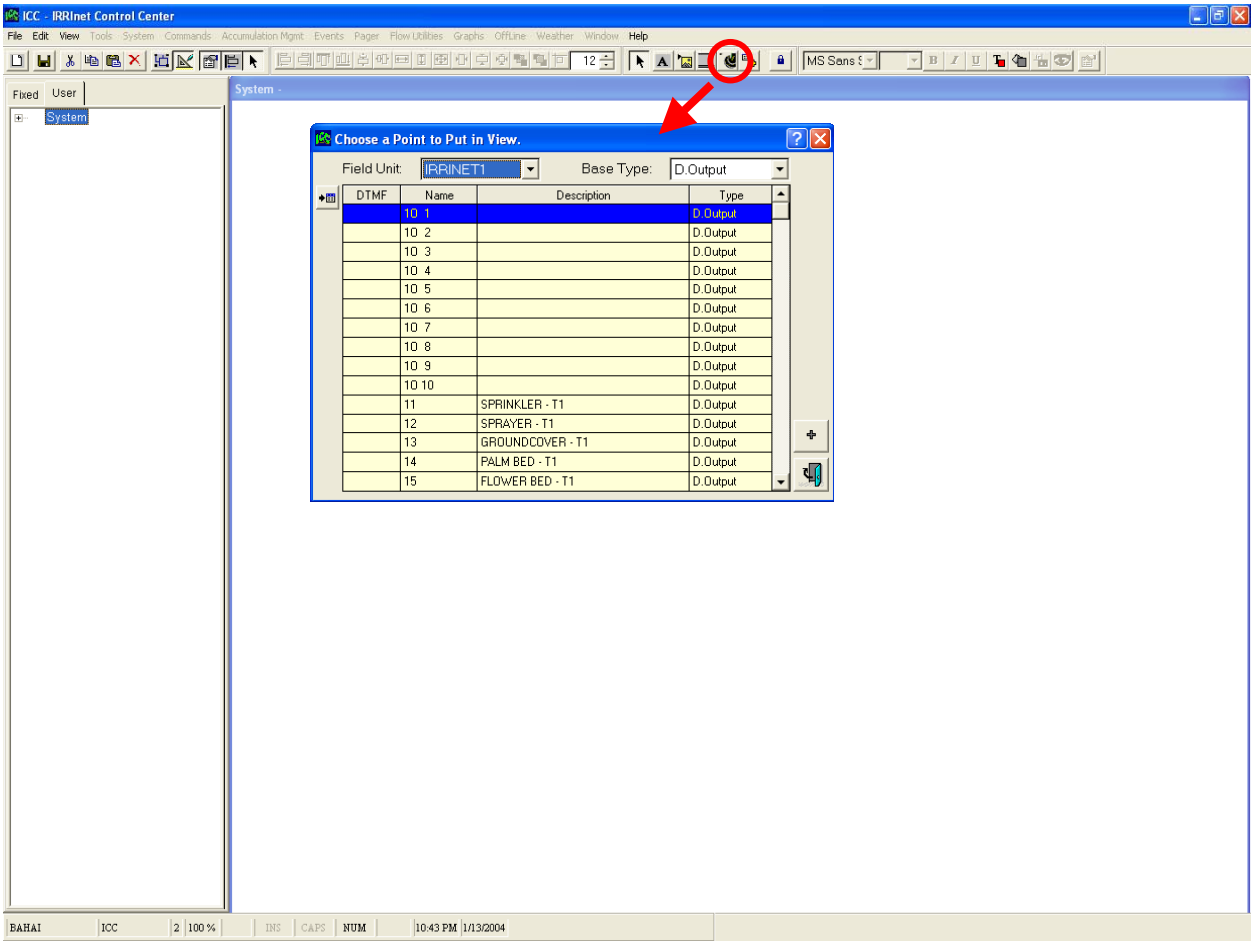
Highlight text, Description.

Click in this box and change the label of an Icon,

Let us use these objects.

Adding an Element:

Click on the icon and, then click on the part of the screen where you would like the icon to appear.

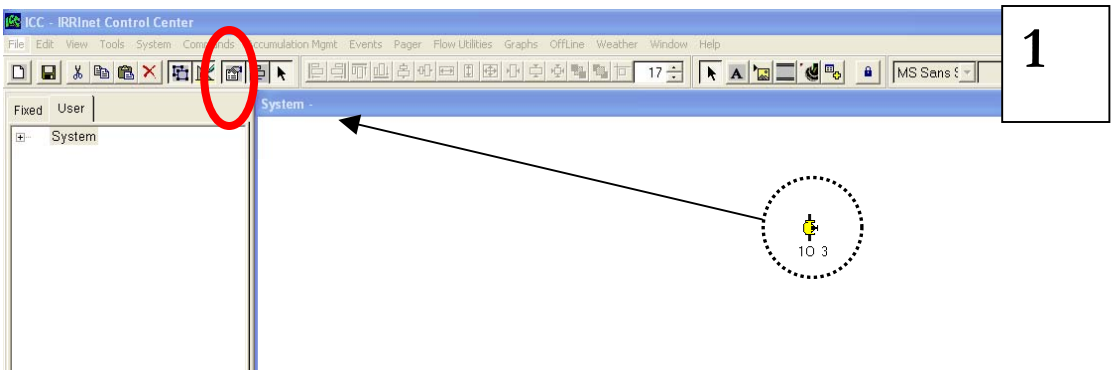

ICC - IRRInet Control Center
File Edit View Tools System Commands Accumulation Mgmt Events Pager Flow Utilities Graphs Offline Weather Window Help
Fixed User
System
System -
Choose a Point to Put in View.
Field Unit: IRRINET1
Base Type: D.Output
DTMF Name Description Type
10 1 D.Output
10 2 D.Output
10 3 D.Output
10 4 D.Output
10 5 D.Output
10 6 D.Output
10 7 D.Output
10 8 D.Output
10 9 D.Output
10 10 D.Output
11 SPRINKLER - T1 D.Output
12 SPRAYER - T1 D.Output
13 GROUNDCOVER - T1 D.Output
14 PALM BED - T1 D.Output
15 FLOWER BED - T1 D.Output
BAHAI ICC 2 100 % INS CAPS NUM 10:43 PM 1/13/2004

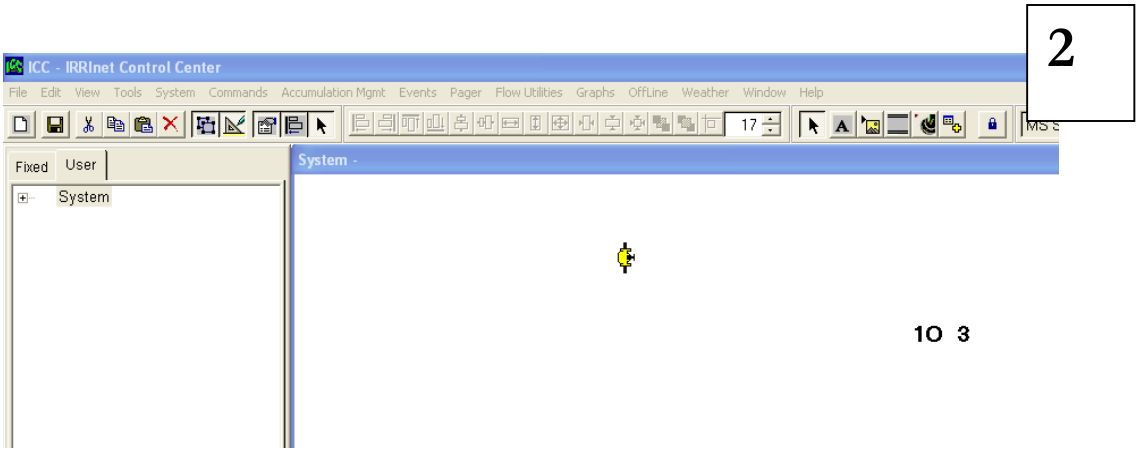
Choose the element you would like to add and click on the "+".

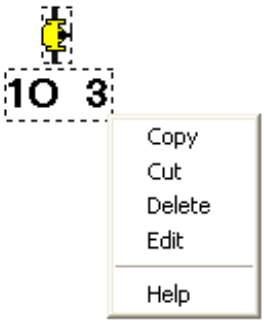
For our purposes we will add a Digital Output. To do so from the ***Field unit*** drop down menu we will choose the relevant RTU and from the ***Base Type*** we will choose D. Output.

The icon will then appear on the screen, which you may then drag and drop to any location on the screen.

However if the Grouping button is checked and you drag the icon the name of the icon will not drag with the icon.

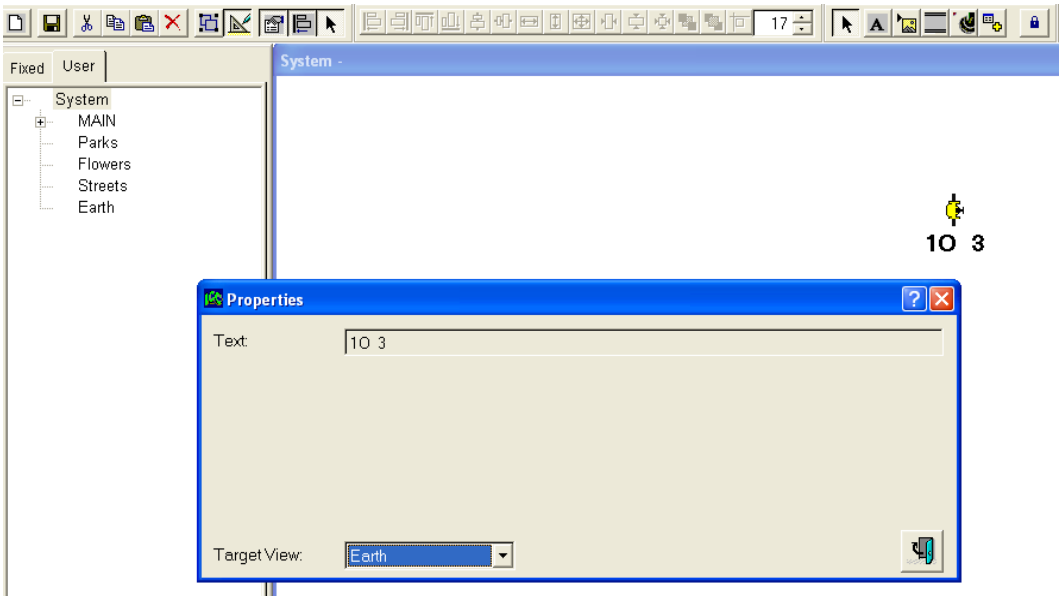






You may right click on an icon to view more options. Click on Edit.

Editing and ICON:



Once you choose edit a new window will appear which allows you to change the target of the ICON. If you change the target, in the user screen each time you click on this icon you will be forwarded to the Target you have chosen. This option works just as hyperlink does on the web.

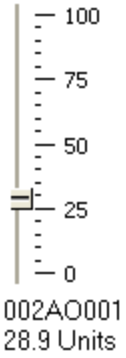
After choosing edit the icons on top become highlighted.

Choose move text and move the text to another location.

Once finished click on the save button and from the view option of the menu bar choose edit mode, or simply click on CTRL+E.

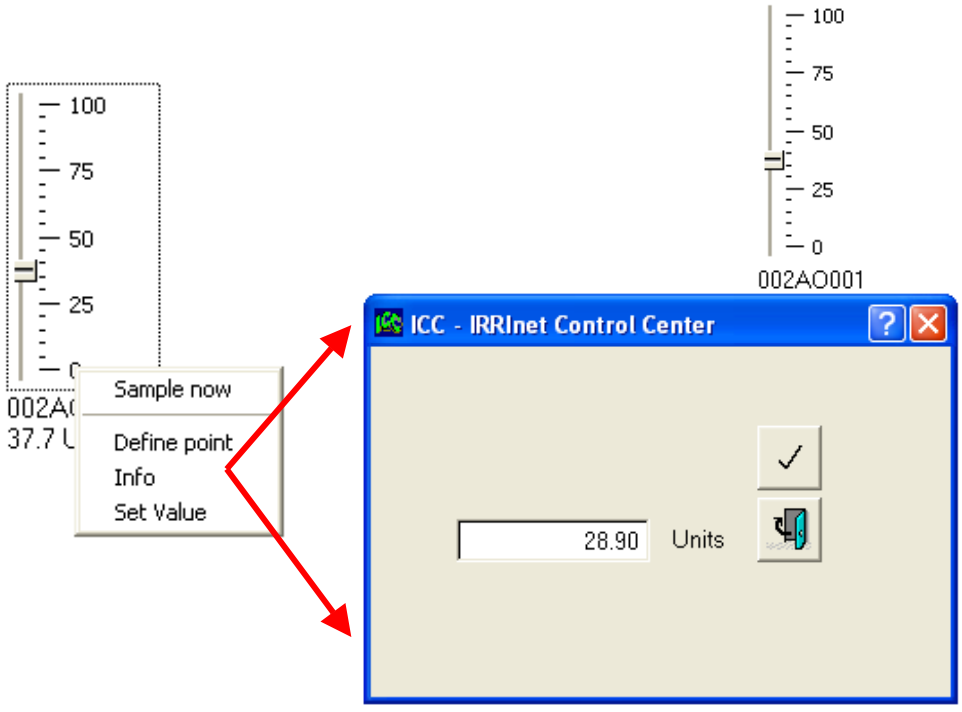
NOTE: Save your work often by clicking on the save button.

Analogue input and output:



Analogue input and outputs are added to the user screen the same as other I/Os however with analogue output values can be changed on the screen.

For example if you have chosen the bar A/O you may drag the value on the bar or for a more accurate setting change the value by right clicking on bar and typing in the value.



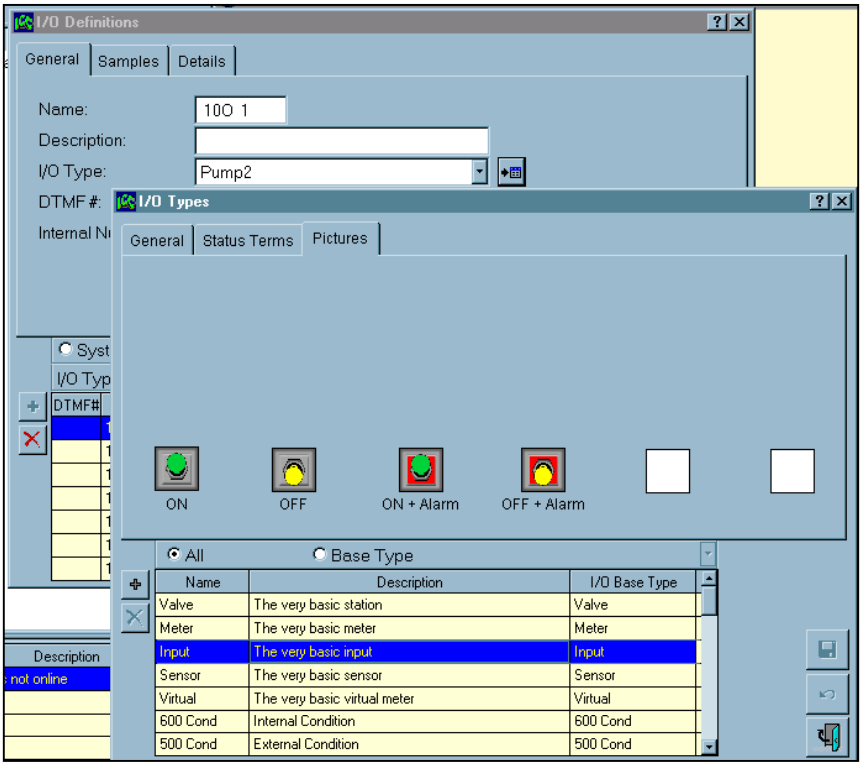
Creating Icons

Motorola supplies a library of icons for your use—the System, Field Unit and Area icons are fixed. As an option, you can create your own icons for the various types of I/O's you have in the system. You can access the following tables in the ICC and import images that become part of your own library of icons.

Changing I/O Icons

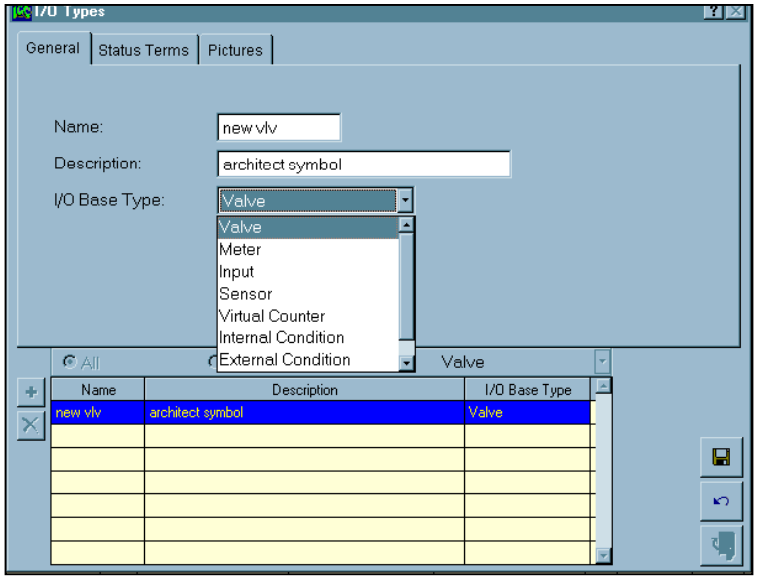
You may change the icons only in the "User" mode of graphics display (changes do not show in the "Fixed" graphics mode).

Bring up the screen, I/O Definitions. Click on the button "edit table".

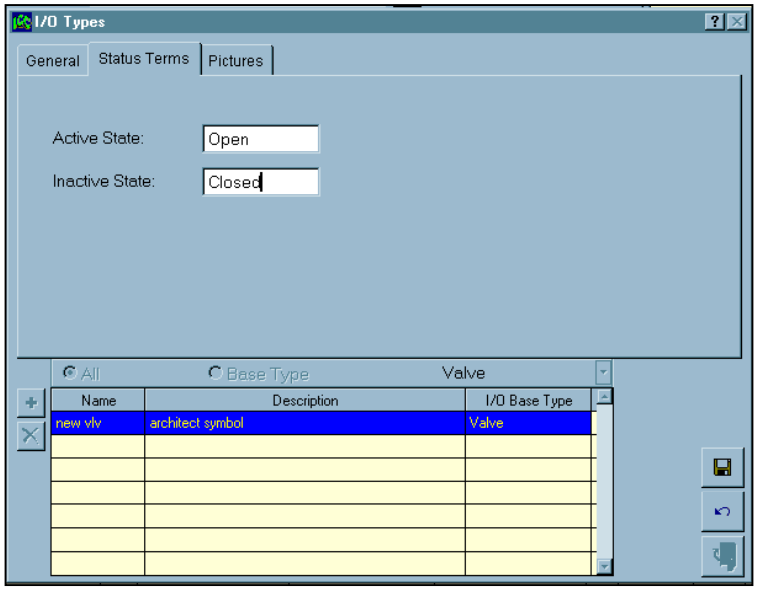


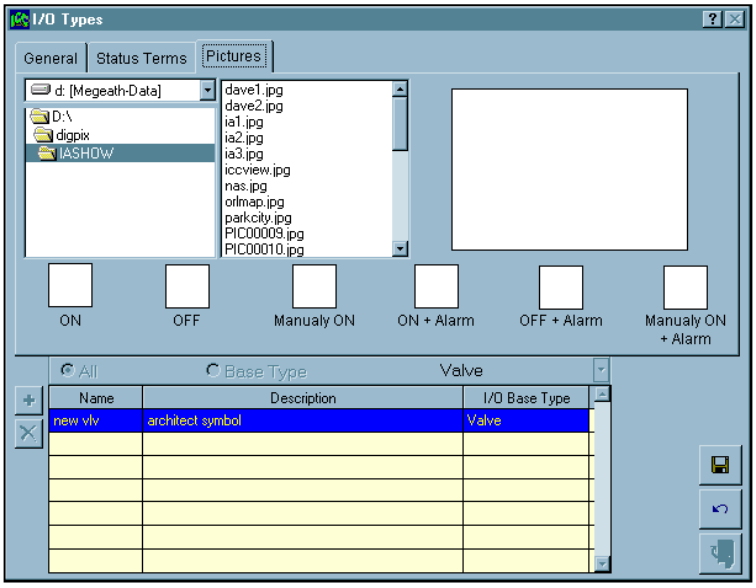
This opens the table, I/O Types. The pre-defined I/O may not be changed. You can add your own by clicking on the add button.

Enter the new I/O type's name and description, and then choose from the drop down list of base types (this acts as a template).



Select the tab "Status Terms" where you may change the terms





This allows you to browse the file storage system on your computer and pick up the images you have created.

Finally, select the tab previously created icons (you should have the related icons created previously, to match each condition of this new D. O).

Select the icon representing the DO is active and drag it into the ON box.